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ORIGINAL ARTICLES.

A REVIEW OF SOME OF THE RECENT LITERATURE OF THE ETIOLOGY, PATHOLOGY AND PROPHYLAXIS OF HYDROPHOBIA.*

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SOME years ago I heard a professor in one of our American medical schools say, in referring to Pasteur, that he was indeed a poor man who could not find a successful treatment for a disease which he had himself created. This skepticism in regard to the existence of hydrophobia in man, strange as it may seem, is still entertained by a few in high places. I cannot answer these men better than by saying that their contention shows complete ignorance of the literature of the subject.

The disease was first described by Aristotle, again by Celsus; in 1767 by Mead; in 1771 Van Swieten distinguished the violent and paralytic forms; Morgagni also describes it, also Gohier in 1811; Gruner in 1813 found the saliva to be the vehicle of infection; again Berndt described it in 1822; Galtier in 1871 produced the disease in rabbits; in 1880 Nocard and Paul Bert began to investigate it in the laboratory. They proved that the poisonous part of the virus would not pass through a filter of porcelain. This brings us to Pasteur and his pupils.¹

Hydrophobia is an acute infectious disease due to the inoculation of a specific virus, usually by the bite of a rabid animal. "In nine-tenths of the cases the disease is contracted from a dog, in a few cases from cats, very seldom from a fox or wolf."² Dogs and cats have the disease more frequently than wolves. Horses seldom have it, cattle are affected rather frequently, while pigs rarely contract it. This is probably due to the large amount of subcutaneous fat in the latter.⁴ Epidemics have several times been reported among deer, and skunks suffer from the disease. Rabies can be inoculated in pretty much all warm-blooded animals and in birds. In Great Britain and Ireland the disease is practically confined to carnivora. Hydrophobia is said to have been produced by the bite of an animal not suffering from rabies. This is opposed to all we know of the origin of other diseases.³ The dog may have had the dumb form of the disease or else had it in a very mild form. The saliva may be inoculated in a wound or on a mucous surface. Senn⁵ recounts a case of his in which the saliva of a rabid dog was inoculated in a pimple on the face of a lady of rank and fashion who succumbed to the disease.

It has been produced by wounds occurring during the dissection of rabid animals. It has also been caused by eating the flesh of animals that had died of the disease. The milk of suckling animals and suckling human beings contains the virus. Bradford tells of a child in the West Indies that contracted the disease from its mother who was suffering from rabies.

The virus is found in the central nervous system, the peripheral nerves, the salivary glands, the pancreas, the lacrymal gland, the suprarenal glands, the mammary gland and perhaps in the seminal fluid. It is not found in the blood, the liver, the spleen or the kidney or urine. In air the virus loses its virulence in fourteen hours, in water in twenty to forty days, in glycerin in one month. It has been found in a dog buried for forty-four days and in a rabbit buried for twenty-one days. Such cases are exceptional.¹

1. *Age and Sex.*—More males than females are affected, the proportion being about four to one. This is due to the risk of exposure and difference in dress. Two-fifths of all cases are under fifteen years of age.²

2. *Location of Bite.*—Bites upon the face and hands are far more liable to produce the disease than others both on account of these parts being uncovered by clothing and on account of the greater likelihood of the involvement of nerves.

3. *Statistics of Frequency after Bites by Rabid Animals.*—G. S. Woodhead⁴ states that 16 per cent. of those bitten by rabid animals contract the disease. Bradford¹ estimates that from 10 to 20 per cent. contract it. Many authorities estimate the percentage to be much greater.

4. *Prevalence.*—The disease is fairly prevalent among animals in certain localities while it is entirely absent from others. Among the former may be mentioned especially Lancashire in England, also Ireland and certain parts of France and Germany, while it is not found in Australia and Norway. It has been introduced by sporting dogs into countries where it was formerly unknown.¹

5. *Period of Incubation.*—The period of incubation varies in man, according to Bradford, from a minimum of twenty days to sixty days, while it is probably unknown after six months.¹ Other authors have given twelve months, two and even five years as extreme limits. Gowers³ considers it certain that the disease has developed after a year or eighteen months and will not deny the possibility of a longer interval. This period seems to vary according to the susceptibility of the patient, the virulence of the disease in the animal inflicting the bite, the amount of virus introduced and the position of the bite.⁴

6. That the disease is due to a living organism which affects the nervous system chiefly is almost beyond doubt. The long period of incubation

* Read before the West End Medical Society, April 4, 1902.

would tend to prove that the infective agent has to multiply in the tissues before it can produce its effects. Whether this agent be animal or vegetable has not been determined. It is scarcely necessary here to describe the many organisms that Gibier, Pasteur, Roux, Fol, Babés, A. Bruschettini and others have from time to time considered to be the cause of the disease. That it is not due to a previously formed poison we can be comparatively certain when we consider the difference in the action of the saliva of a rabid animal and the venom of a snake. Again the similarity of this disease to tetanus would suggest a similar causation.

Pathological Anatomy.—The blood is usually fluid, there is marked congestion of the fauces, pharynx, larynx and stomach. The stomach of the dog usually contains all kinds of substances, such as wool, hair, coal, wood, etc. Minute hemorrhages may occur beneath the pleura, probably being due to the asphyxia which usually precedes death. Some perivascular exudation of leucocytes may be found in the salivary glands and kidney. The brain, medulla and spinal cord often present marked congestion and very minute hemorrhages may be found. Microscopical examination of the cerebrospinal system will often reveal exudation of leucocytes into the perivascular spaces in different localities, minute thrombi, hyaline changes in and around the blood vessels, exudation of leucocytes around nerve cells, together with more or less marked changes in the latter, consisting in swelling of the cells, chromatolysis with the appearance of hyaline bodies and vacuoles.

These changes in the nervous system are most marked in the medulla, especially in the neighborhood of the pneumogastric and hypoglossal nuclei; they are next most marked in the cord, and least in the brain itself. Most authorities agree in considering these lesions as not characteristic. They are said to occur in other diseases and in certain cases of poisoning by phosphorus and arsenic. Babés⁸ insists most strongly upon the importance of these perivascular and pericellular nodules and considers them of more importance than the ganglionic lesions of Van Gehuchten which I shall presently describe. Subsequent investigations by several authorities do not seem to sustain him absolutely in the contention, and most investigators regard the following observations as having the most important practical relation to diagnosis.

In 1900 Nélis demonstrated before the Academy of Medicine of Paris certain changes in the peripheral ganglia of the cerebrospinal and sympathetic nervous systems that have the most direct bearing upon the nature of rabies.⁹ If a spinal ganglion of a normal dog be examined it will be found to be composed of a peripheral zone made up for the most part of nerve cells and of a central part which is traversed by bundles of nerve fibers which join either the posterior root or a peripheral nerve. Between these central fibers there are some islands of nerve cells. Each one

of these nerve cells is enclosed in a capsule. This capsule is composed of two layers, an external fibrous layer, and an internal layer consisting of a single row of endothelial cells. If a spinal ganglion of a dog that has died of rabies be examined, it will be found that a number of these nerve cells have more or less completely disappeared, while their place is taken by numerous small cells regularly arranged and having their origin in a proliferation of the endothelial cells lining the capsule.

By examining different sections, progressive degenerative changes in the nerve cells may be noted. These consist chiefly in chromatolysis, or solution of chromatophile substance, which is more or less complete. Nuclear changes vary likewise from cell to cell. The most frequent changes are hypertrophy of the nucleolus, hyperchromatosis and fragmentation of the nucleus. These changes in the nerve cells may be met with in different degrees in all the cells of the cerebrospinal axis and are not characteristic of rabies. The proliferation of the endothelial cells of the cell capsule, however, is regarded by Van Gehuchten and Nélis⁷ as being pathognomonic of this affection. Besides the changes in the cell and its capsule there are present also dilatation of the blood vessels and perivascular exudations of leucocytes. These lesions are most marked in the plexiform ganglion of the pneumogastric. They are often absent when a dog is killed before the paralytic stage. They are often absent in experimental rabies when virus from the medulla of a mad dog is injected subdurally, and are usually absent when fixed virus is administered in the same manner. Nocard considers this method as most valuable on account of its simplicity and the rapidity of its application. These lesions have been fully verified by Cuillé and Vaillée, McCarthy and Ravenel and many others. The animal should be allowed to die or not be killed until the paralytic stage of the affection.

When a person has been bitten, it is the duty of the physician to look up the dog. If it happens to be a stray dog, of which all trace has been lost, Van Gehuchten⁸ advises that the Pasteur treatment be at once resorted to. If the bite has been made by a known dog that does not as yet present symptoms of rabies, he should be confined for a few days. The saliva is virulent only twenty-four to forty-eight hours before the appearance of symptoms (Nocard, Roux). Generally these lesions will exist after the dog has become dangerous. The dog will usually live only two to five days, when a pathological examination will be most likely to give definite information. Of 44 cases examined by Degive, 37 had rabies and showed the changes, 7 did not have rabies and did not show them. J. Crocq and others have called attention to the similarity of the changes in the pneumogastric and other ganglia occurring in other diseases, especially diphtheritic croup. In diphtheria, however, the lesions are only capsular while in rabies they are both vascular and capsular. He calls attention to the similarity of

conditions in the pneumogastric in the asphyxia of the two diseases.* Nocard said, after verifying the work of Cuillé and Vaillée, that he knew of no disease up to that time in which precisely similar lesions had been found.

In a recent paper, D. J. McCarthy and M. P. Ravenel¹⁰ of the Wm. Pepper Clinical Laboratory (Phoebe A. Hearst Foundation) report concerning 105 animals suspected to be rabid; of these 75 were dogs, 11 cows, 2 horses, 2 cats, 15 rabbits (experimental); one of the cows was also experimental. Forty of these cases were controlled by inoculation into rabbits, while many of the dogs were kept at the Veterinary College of the University of Pa. for many days. In 60 of these cases both the medulla and intervertebral ganglia were examined; in 36 only the ganglia, and in 7 only the medulla. In only 2 cases did they fail to find the lesion of Babés in the medulla when the changes in the ganglia were marked, but in several the bulbar lesion was slight. The vascular tubercle of Babés was much more frequently found than the one having the nerve cells as a starting point. Of 22 dogs killed, in 7 the authors would give no opinion. In 87 of 105 cases they were able to give a prompt diagnosis by examination of the ganglia alone, and in 94 by an examination of the ganglia and medulla.

The great advantage of this test is evident when it is considered that it may be done in twenty-four hours by hardening in alcohol, or in one hour if frozen sections be made, while experimental inoculation in rabbits takes from twelve to fourteen days usually, and may take forty days or more.¹ To neglect no precaution, the clinical history of the dog should be carefully considered, his spinal ganglia and medulla should be examined and inoculation into rabbits be made.

GENERAL PROPHYLAXIS.

1. Stray dogs should be destroyed as they generally cannot be located and watched after the bite has been inflicted.

2. Literature should be disseminated among the police and people concerning the necessity of trying to capture instead of killing dogs that have bitten any one, or that are supposed to be rabid.

3. *Muzzling of Dogs.*—On account of the muzzling of dogs hydrophobia has rarely occurred in Germany. The deaths for 1894-'98 were only 4 or 5 in animals.¹²

"In the metropolitan district of London, in which the muzzling order is now in force, there were in 1889, 176 cases; in 1890, the number had fallen to 44; in 1891 to 28, and in 1892 to 3. This fall corresponded to and was continuous with the enforcing of the muzzling order. As soon as the order was allowed to lapse, a rise in the number of cases began and continued until the order was re-enforced. During the five years mentioned no fewer than 25 persons died of hydrophobia, and 147 cases were sent for treatment to the Pasteur institute."⁴

4. *Treatment of the Wounds.*—As the poison is but slowly diffused there is a fair chance of

getting rid of it entirely if proper measures be at once resorted to. A ligature should be placed about the limb and cupping or suction be resorted to and a physician be called. Some recommend immediate excision of the tissues in the neighborhood of the wound. Should this be inexpedient it should at once be cauterized. Dr. Cabot, of our Board of Health, has detailed a series of experiments in regard to the value of various cauterizing substances. He finds that 91 per cent. of guinea pigs inoculated with medulla of rabid guinea pigs do not develop the disease if their wounds be cauterized with fuming nitric acid at the end of 24 hours. Nitric acid is better than the actual cautery, and this in turn is better than nitrate of silver. In the case of small wounds he considers cauterization with nitric acid to be all that is necessary.

5. *Prophylactic Inoculations.*—About a score of years ago Pasteur discovered that the virus derived from the spinal cord of a rabid dog was attenuated by keeping. He also found that rabic virus could be attenuated by passing it through a series of monkeys until it became powerless to produce death. By passing this attenuated virus through a series of rabbits its virulence could be entirely restored. He also found that by passing the virus of a rabid dog through a series of rabbits (100) its virulence could be augmented, so that the ordinary incubation period of from fourteen to twenty days could be reduced to seven or even six days. This was the strongest virus obtainable which he termed "*virus fixe*." He first succeeded in a measure in producing immunity in dogs by the use of virus attenuated by passage through various animals. This system was difficult, uncertain and only partially successful. Later, assisted by Roux and Chamberland, he cut a series of cords of rabbits dead of injections of "*virus fixe*" into short sections, which he exposed to the action of dry filtered air at 72° F. for different lengths of time. He found that the cord removed after twenty-four hours was but slightly reduced in virulence, that removed after forty-eight hours was somewhat more reduced in virulence, and that the virulence gradually diminished until at the end of two weeks the virus was incapable of producing rabies. Now he injected an emulsion of the fourteen-day cord into a dog that had been bitten by a dog known to be suffering from rabies; this was followed by an injection of the thirteen-day cord and so on until the unattenuated cord was injected. By following up this system he proved that not only could a dog be protected against the bite of a rabid dog inflicted some days beforehand but that he could be protected against the fixed virus administered subdurally.

In 1885 this system was applied in the case of Joseph Meister who had been bitten by a mad dog. He was alive and well after five years. There are now used at the Pasteur Institute two methods known as the "simple" and the "intensive." In both methods cords are employed in increasing strengths until the three-day cord is finally

administered subcutaneously. In the simple method 19 injections are given in fourteen days. The intensive method is used for specially severe lacerated bites on the face and in the vicinity of large nerve trunks, and in the case of bites by wolves. This method consists in the administration of 28 injections in twenty-one days. Here the number of injections which, in the simple treatment, are spread over five days, are made in three days; then, on the fourteenth day, a fresh series of injections or rather repetitions, is begun which lasts until the twenty-first day.⁴ The Board of Health of this city now makes prophylactic injections as well as pathological examinations, and inoculations for purposes of diagnosis.

Time prevents me from giving but a few statistics. I shall give only a summary of the cases treated at the Pasteur Institute, Paris, from 1886 to 1895 inclusive. If the cases be excluded in which the disease declared itself within a fortnight after completion of the treatment, there are 17,337 cases with 83 deaths, a mortality of 0.48 per cent. If all the cases be counted in which treatment was completed, we find 17,385 cases with 129 deaths or 0.74 per cent. Ten cases died during treatment, so that in all there are 17,395 cases with 139 deaths. Now Bradford's² conservative estimate gives the mortality of those bitten by dogs adjudged to be rabid at from 10 to 20 per cent. If we make even more than due allowance and place the mortality at 5 per cent., we find that among the above-mentioned cases we should have had 869 deaths, more than six times as many as we actually find after the Pasteur treatment.

Granted that a few have perished from the treatment, its inestimable value is beyond question. Many eminent authorities, however, agree that the treatment is absolutely harmless. It received the endorsement of a commission, of which Victor Horsley was chairman, appointed by the British House of Lords to inquire into Pasteur's methods.¹⁴

Serum Therapy.—We come now to an aspect of our subject which promises much. The difficulty of finding an antirabic serum can be appreciated when we consider that the germ of the disease has not been isolated, so that we do not know whether we have to find an antitoxin, a bacteriolysin, a precipitin or a combination of these substances. The first work along this line was done by Babés and Lépp in 1889, later by Tizzoni and Schwarz and then by Tizzoni and Centanni. In 1895, after six years of study and experiment, Tizzoni and Centanni published their work. In their experiments they used virus attenuated by digestion with gastric juice, which method being introduced by Eusebius Valli in 1886, is known as the Italian method. The latter found that digestion of virus by this method, while diminishing its virulence, in no way impairs its protective power. By making 17 injections in twenty days into a sheep (.25 gm. per kilo., of emulsion of nerve substance weakened by gastric juice) they found that after twenty-five days they had a pro-

TECTIVE serum of great potency. For revaccinations of the sheep they employed 10 injections in twelve days.

This serum cannot be increased in power beyond the point at which they arrived, but it can be maintained at a constant strength by repeating the inoculations from every two to five months. Moreover, it can be evaporated to dryness and will keep for months if protected from light.

Their typical serum (T. S.) is such that in proportion of 1-25,000 per kilogram weight of rabbit it will protect it against one infection unit of virus if administered subcutaneously twenty-four hours before the subdural injection of the virus is given.

An infection unit is the greatest dilution of any virus that will surely kill without any prolongation of the incubation period when .013 c.cm. per kilo. of animal is administered beneath the dura. The dose of virus actually used by them was .013 c.cm. per kilogram of canine virus diluted 1-50 which equaled .00026 c.cm. pure canine virus. They employed also two specimens of fixed virus, the first in a dilution of 1-5,000, and the second in a dilution of 1-10,000. Of the former the actual dose (.013 c.cm. of dilution per kilo.) was 0.0000026 c.cm., and of the latter .0000013 c.cm. fixed virus.

One c.cm. of their serum (T. S.) neutralizes *in vitro* 1,200 infection units. On the eighth day 10 c.cm. of this serum protected rabbits weighing about 2 kilograms from a dose of canine virus twice as concentrated as was usually used for subdural injections, introduced into the sheath of the sciatic nerve.

On the first day after infection a dose of serum as much as five times greater than the protective dose is required, not to save the animal but only to postpone its death. On the eighth day the protective dose is to the curative as 1-10. The preventive against the virus of rabies is to the preventive against the fixed virus as 1-200. When the period of injection is postponed to the fifth to eighth day, Tizzoni and Centanni find that the curative dose has only to be multiplied some 8 or 10 times, whereas in diphtheria it must be increased at least 20 to 100 times, and in tetanus several thousand times. As in the case of tetanus, these authors found the subdural injection of the serum far more efficacious than the subcutaneous method. The subcutaneous dose of serum is 12,000 times as great as that by direct contact.

The great advantages of a serum become at once manifest, as one small dose is effective immediately, no special skill is required, and the dried serum can be transported to a distance. How long will the immunity last? The authors state that inasmuch as a sufficient dose always prevents the disease, it does not matter much how long immunity lasts. This method has not been applied to human beings so far as I have been able to ascertain, but it is certainly encouraging from a scientific aspect.

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HYDROPHOBIA: SYMPTOMS AND DIAGNOSIS.*

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THE death within the past few months of the son of one of New York's most prominent physicians from what appears to have been unquestionably hydrophobia has attracted the attention of the profession and public with renewed interest to this most dreadful disease. Investigation resulting from this interest has developed the facts, according to official statements from the Board of Health, that the disease in both dogs and men, and also in horses, has shown a material increase during the past two years. It seems, therefore, appropriate as a subject for prompt and general discussion by the profession, and this Society is to be congratulated upon the alert wisdom of its President, Dr. Myers, who suggested it as the topic for this meeting.

My chief regret is that he was apparently unable to select any one better equipped in personal experience to present the subject to you. Such a dearth of personal experience and opportunity is both an advantage and a disadvantage. We are spared on the one hand the infinite distress attendant upon witnessing the agonized sufferings of such hopeless cases; on the other hand, we are robbed of the opportunities and inspirations which result from extended experiences and observations in the helpful study of disease. Possibly if hydrophobia were more frequent, it would be proportionately less terrible.

The disease is almost as old as medicine; it was certainly recognized and mentioned as occurring in dogs in the earliest records of medicine. Among the Greeks it was known as *lyssa* or *lyssophobia*. The worm (*frenum*) under the

dog's tongue was supposed to be causatively related to the disease in some way. The term *lyssophobia* still occurs, especially among the Germans, its application to-day being largely restricted, however, to pseudo or false hydrophobia, the hysterical prototype or equivalent of the true disease. Is there a true disease? Are not all cases of so-called hydrophobia essentially hysterical? That people die with this symptom complex is not a final argument; that the influence of the mind upon the body is at times sufficient alone to arrest bodily function and cause death is abundantly proven by numerous experiments and facts observed in varied spheres of investigation. It is a curious fact in connection with the general subject that this has been a moot point, a vexed question since our very first knowledge of the disease. The pendulum swings from time to time from the extreme of unquestioning faith and acceptance to blind and extreme and dogmatic skepticism. In recent years the school of doubt has been most ably represented by no less a dean than Spitzka, whose experiments and observations seem to have convinced him at least that no such thing as hydrophobia exists, except as the product of a diseased and overwrought imagination. High in esteem as I hold any view or opinion entertained by so eminent an authority, I am compelled, in the light of what seems to me overwhelming and incontrovertible evidence, to accept hydrophobia as an actually existent medical entity and a frightful one at that. That the disease seems peculiarly and in extraordinary degree to be associated with an atmosphere of hysterical simulation and to inspire states of autosuggestion, must be admitted. One case of genuine hydrophobia in a community, especially if graphically described in the public press, will inspire fifty or a hundred examples of the pseudo type, and some of these latter may even prove fatal.

Infectiousness by example, so to speak, in nervous disease, is well known and admitted, as in chorea, hysteria, the various tics, etc. There seems to be a special and peculiar infection of morale in the atmosphere of this disease, possibly, and, indeed, probably explained by the horrible significance of symptomatic detail, and the utter hopelessness of the situation, both factors intensifying this mental impression.

Admitting the existence of hydrophobia as a disease entity, what are the symptoms by which it is to be recognized, and by what means are we to differentiate the true disease from the false and from other kindred affections? My confrère, Dr. Taylor, will pardon me if I necessarily encroach at this point somewhat upon his territory. I shall be as conservative as possible in my invasion. It is accepted as essential that the victim shall be infected extraneously—the dog, the cat, the wolf, skunk, and sometimes other animals, by biting introduce the virus of the disease. Within six weeks or six months, the wound having meantime healed apparently, in a normal way, the victim notices a lassitude, a malaise, and perhaps some slight feverishness with depression of spirits

* Read before the West End Medical Society, New York, May, 1903.

and nervous irritability, and simultaneously, as a rule, some recrudescence of irritation appears at the site of the original bite, slight redness with pain, and some stiffness or paresthesia is noted. This extends sometimes along the centripetal direction of nerve or blood vessel, or both, and at times the lymphatics are involved, and there is at this stage, termed the first great mental anxiety, a state of anxious apprehension and restless foreboding present, even in those who have forgotten a previous dog bite. Hydrophobia has been reported in idiots, and in the deaf and dumb. The temperature usually does not exceed 101 or 102° F., and may rarely be normal; the pulse is somewhat though not markedly accelerated, the face is alternately flushed and pallid, apparently as a reflex to the emotional equation. This, the stage of irritation, continues for two or three days, sometimes less, and ends abruptly in what is termed the convulsive stage. This second stage is introduced, as a rule, by symptoms indicating spasmodic difficulty in deglutition; stiffness of the neck muscles is complained of. On account of fever and hurried respiration, there is usually marked thirst and a consequent desire for water. Attempts to swallow the water are found to induce a spasm of the glottis and of the pharyngeal and neck muscles, the water being rejected by mouth or regurgitated through the nose. Repeated attempts produce the same result, so that finally the sight of water or the sound of running water will induce most distressing spasm of all the musculature of deglutition. Even the word "water" spoken in the hearing of such patients, or the washing of the face, may, by association provoke a spasm. The thirst increases, the patient tries again—again the result is the same. Can you imagine a more agonizing situation? Solids or semisolids can sometimes be swallowed, but by no means always. Sometimes the spasms become general—indeed, this is often the case—not only is the general spasm excited by efforts to swallow or by the sight or sound of water, but it may be excited by any source of reflex stimulation—a loud sound, a gust of wind, a touch upon the body anywhere may prove a sufficient exciting cause for generalized convulsions. Delirium may and often does ensue in the intervals. It is, however, sometimes absent throughout. Active hallucinations of any or all the senses, particularly of vision, may occur, and a state of exaggerated, almost frenzied terror may develop. The mental state is occasionally typical of acute delirium grave. After one, two or three days' duration this, the second or convulsive stage, gradually or abruptly passes into the third or paralytic stage. The pulse becomes weak, respiration hurried, general paralytic weakness supervenes and the patient quickly becomes stuporous and finally moribund, with evidences of pontine invasion and of pneumogastric failure. This stage rarely exceeds twenty-four hours in duration.

In many cases of rabies, as the disease is termed when it occurs in dogs, the first and second stages as described above do not occur, the

dog passing at once into the paralytic stage. This variety is known as dumb rabies, and is said to occur occasionally, though rarely, in human subjects. Among symptoms specially noted by different observers, Watson particularly emphasizes a peculiar sobbing or shuddering respiration, such as is made by a person entering cold water. McCarthy and Ravenel call attention to an expression of terror not due to suggestion, as in both cases cited the patient was a young child.

The all-important problem in differential diagnosis is the distinction between true and false hydrophobia. It should never be forgotten that death has occurred from the false disease. In such cases the moral attitude of the attending physician, stimulated to firmness by conviction, may decide the issue as between life and death. The following points are more or less constant in the differential diagnosis. In pseudo or hysterical hydrophobia, the incubative period is either much shorter or much longer than in the true disease—symptoms developing earlier than a week or ten days, or even three or four weeks after a bite are suspicious, just as delay beyond five or six months is suspicious of the pseudo disease. It should not be forgotten however, that the true disease has developed within five days from the bite, and that it has been delayed for as much as twelve months. Symptoms developing within a day or two after a bite are almost certainly hysterical. The order of sequence in the hysterical disease is characteristic sometimes. There is no first and no second stage. The patient develops at once the second or convulsive stage. Hysterical hydrophobics nearly always show a disposition to bite those about them—very rare in the genuine disease; they also bark and growl and snap with much more imitative accuracy than in the genuine disease. To show them the dog that bit them, alive and well, is often a final test, the result being immediate recovery. Should the symptoms in any case last over seven days or ten days at most, this fact alone is almost conclusive as to the non-existence of the genuine disease. The crucial test, of course, is that of Pasteur inoculation.

From tetanus, often closely resembling hydrophobia, the latter disease is to be distinguished by the greater prominence of trismus; by the fact that the cause is a wound and not a bite; by the absence of mental symptoms; by the absence of remissions in the convulsions; by the absence of thirst, expression of terror, dribbling of saliva, and by the shorter period of incubation. In certain cases of acute mania, there may be gustatory hallucinations and fear of water. In such cases there are, however, no tonic or clonic convulsions, the patient may be induced diplomatically to drink, there is no history of the bite of a warm-blooded animal, and there are the other symptoms of mania.

Female Physicians in England.—There are about 90 female physicians in London and its suburbs. The Royal Free Hospital employs 16, and there are 70 women students in it. In all England there are about 600 women physicians.

RABIES.*

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OF NEW YORK.

FROM the time of Aristotle (322 B.C.) to the present day we have clear accounts of this disease existing through every age, and provoking fear and horror in many countries. It was caused by the bite of an animal and such animal was generally believed to be mad.

The medical and veterinary profession have always recognized the existence of such a disease as rabies in man and animals and also believed in its existence and contagiousness. It was not until the nineteenth century that by experimental inoculation it was shown that the dog which did the biting was actually rabid, and that the disease certainly resulted from the bite, and that the disease in the dog and man were identical. Notwithstanding the fact that it had been very clearly demonstrated by competent investigators that rabies may be easily communicated by inoculation from animal to animal and man to animal, there are many who still believe that hydrophobia is not a specific disease and is about as likely to follow the bite of a healthy dog as of a diseased one.

If the skeptics would only stop to consider that an animal cannot communicate a contagion it does not possess, the absurdity of spontaneous origin would be apparent. One might as well say that smallpox arises spontaneously and that the disease can be contracted from healthy persons.

Hydrophobia has been observed in the following species: dog, cat, horse, ox, donkey, mule, sheep, goat, hen, pigeon, wolf, fox, prairie dog, hyena, monkey, deer, skunk, rabbit, guinea pig, rat and mouse.

Prevalence of Rabies.—For years we have been led to believe that this disease was extremely rare. In 1900 Dr. D. E. Salmon, chief of the U. S. Bureau of Animal Industry, to determine the occurrence of rabies in the United States, wrote to a number of veterinarians and was surprised to learn that the disease existed in nearly every State and was evidently on the increase. City veterinarians who doctor dogs see many cases of rabies. During the year of 1902, 20 cases came under my observation, and four since last December. On two occasions I noticed small boys leading rabid dogs through the street. I believe if an accurate record of rabid dogs in the Borough of Manhattan could be had, the result would be startling.

In dogs hydrophobia appears in two forms, furious rabies and dumb or mute rabies. According to Pasteur, furious rabies occur when the brain is invaded by the rabid virus and dumb rabies when this reaches the spinal cord first. I have noticed that in many cases when an animal was bitten by a rabid dog on the head or face it produced the furious, and if bitten on the body or legs the dumb form developed. Three cases came

under my observation during the month of January; two dogs and a horse all were bitten on the nose by the same dog and were subsequently affected with the furious form of rabies.

The furious form of rabies presents three periods: (1) melancholic period; (2) irritated period; (3) paralytic or terminal period. The duration of the first period varies from twelve hours to two days. During this time we notice a change in the patient's habits; he is depressed, gloomy, or anxious, defiant, restless, cross, and very irritable. He no longer obeys his master. He hides away, changes position suddenly. Some animals are exceedingly gentle and affectionate. In the beginning appetite is good but they soon refuse to eat. They lick cold objects or bite everything within reach and swallow foreign bodies, such as straw, coal, wood, feathers, pebbles, rugs, etc. We sometimes notice nausea and vomiting.

The second period, that of irritation, lasts three or four days and is characterized by spasmodic mad attacks, the restlessness increases and an irresistible force induces the patients to run away, covering great distances in a short time. They have a great inclination to bite and show no sign of fear; and rarely avoid people or animals, and when caged chew continuously on the bars, breaking their teeth or fracturing their jaws. At this change the bark is changed to a peculiar howl.

The third, or paralytic period, the animal presents a sullen and scowling expression, the lower jaw is paralyzed and hangs pendulous. The gait is staggering and he dies from cerebral paralysis or exhaustion from the fifth to the eighth day.

Dumb rabies is distinguished from furious rabies by the absence of the second period of irritation. The most characteristic symptom of dumb rabies is the dropped lower jaw, animal being unable to close the mouth, the tongue is hanging out, and there is dribbling of saliva. The membrane of the mouth is dry, discolored, and covered with dirt or dust. The lower jaw being paralyzed, the dog cannot bite, nor does it desire to; while in the third stage of the furious form when the jaw is also paralyzed, the desire and tendency to bite may be retained. The course of this form of rabies is short: death usually occurring in from two to four days.

The dumb form of rabies is very common and many cases are brought to the veterinary hospitals with the owners' suggestion that the dog has a bone in his throat, and in many instances we are unable to convince the owner of our diagnosis, who generally understands that a mad dog must froth from the mouth, be afraid of water, and raging mad. It is a dangerous error to suppose that the disease commences with such signs. Rabid dogs are not afraid of water, to the contrary, they lap and plunge their heads into it, some will even swim rivers. The symptoms appear very gradually and the only change noticeable is in the animal's habits and behavior.

Beware of a dog when it becomes dull and hides away, appears restless, always on the move and prowling. Whose countenance is somber and sul-

* Paper read before the Alumni Association of the Bellevue Medical College.

len, walks with head down like a bear. Beware of one who barks at nothing when all around is still. Beware of a dog that scrapes incessantly and tears up things. Look out for the dog which has become too fond of you, and is continually trying to lick your hand and face. Beware, above all, of the dog who has difficulty in swallowing, which appears to have a bone in his throat, and one that has wandered from home and returns covered with dirt, exhausted and miserable.

How inconsistent with modern preventive medicine has been the handling of this terrible malady, the most feared and dreaded disease of mankind. Knowing as we do the reality of rabies in dogs and that hydrophobia in man is caused by bites, the first thing that ought to appeal to the medical mind is to get rid of the dangerous dog, and prevent the transmission of this terrible disease. It does not appear that any effort was ever made in this city in that direction. The whole aim seems to be to apply the Pasteur treatment. Numerous so-called "Pasteur Institutes" have sprung up and from their prosperous condition I should judge that a great many more persons are bitten by dogs than we are aware of.

Rabies is relatively more common in New York because dogs are very numerous, and if suitable regulations are not adopted and enforced the disease will surely increase, and the health of the people be unnecessarily jeopardized.

By a law enacted some years ago, the American Society for the Prevention of Cruelty to Animals was given power to license and gather in and destroy all homeless and ownerless dogs. This private corporation enjoys a yearly revenue of many thousands of dollars from such unconstitutional tax, and the only service it has rendered the people is to catch all unlicensed dogs that their men may happen to run across; throw them all together into a wagon or automobile where they fight and bite until the wagon reaches the pound, where I am told the same thing is practised.

By their methods this Society may be accessory to the spread of rabies, for example: One of these dogs may be rabid and bite one or more of the others that may be later on reclaimed and taken home. Suppose in a few weeks he develops rabies and goes on biting other dogs or perhaps some person. This has happened. This method also exposes reclaimed dogs to other contagious, infectious, and parasitic diseases.

This same society refused a certain bacteriologist the opportunity of making a diagnosis of a supposed case of rabies in a dog that had bitten one or more persons. I was not at all surprised at this, knowing that the president of this society believes that there is no such thing as rabies, except in the imagination and he some years ago issued an article on rabies and hydrophobia, which was scattered broadcast over the country, stating that it was unnecessary to enforce regulations against rabies in animals. I noticed only the other day, in a newspaper interview, that he still holds the same belief.

It is high time that this very serious dog ques-

tion should be taken out of the hands of a private corporation, whose only care seems to be to collect license fees, and place it where it properly belongs, under the municipal control of the Health Department.

Dr. Salmon states that there is no contagious disease more easily eradicated than rabies. As the disease can only arise from contagion, and the contagion is practically always transferred by a dog's bite, it suffices to stop the dogs from biting for a period sufficient to cover the incubatory stage of the disease, that is, for about a year, in order to stamp out the malady. As a scientific problem, therefore, the eradication of rabies is a very simple matter, but as a practical question it is one of the most difficult which confronts the sanitarian.

And this difficulty arises not from anything inherent in the work to be accomplished but in the opposition of those who own and keep dogs. The measures necessary for the eradication of rabies are two in number: (1) Destruction of worthless, ownerless, and vagrant dogs; (2) efficient muzzling of all dogs which appear upon the streets or in public places. The results which have been obtained by muzzling justify its enforcement wherever there is an outbreak of rabies.

In Berlin from 1845 to 1853 there came to the Veterinary School a yearly average of 35 cases, from March, 1852 to 1853 there were 82 cases, and from March, 1853, to the end of July there were 37 more.

On July 20, muzzling was generally enforced with the result that but 6 cases were reported during the remainder of the year. Only 4 cases were observed in the whole city during 1854, and but a single case in 1855. For the seven years following there was not a single case recorded.

In 1863 muzzling was relaxed and rabies gradually increased until 1875 a law was passed extending to the whole of Prussia, which provides that all dogs suspected of rabies shall be immediately killed, as also all animals which it is evident have been bitten by rabid animals, and that all dogs in a district which has been infected by an outbreak of rabies shall be confined, or, when abroad, both muzzled and led. After the enforcement of the above law no case occurred for about ten years. Fleming states that in Vienna rabies was entirely suppressed by eighteen months of stringent muzzling, but in 1886 the muzzling order was rescinded and badges had to be worn on dog collars instead; in the following half year there was only one case of the disease, but in the next half year rabies became epidemic, and the muzzle had again to be worn, with the result that the malady soon subsided and disappeared. The value of the muzzle in suppressing rabies has been perhaps best demonstrated in London on several occasions, especially in 1885. In the previous years hydrophobia had increased to a very alarming extent in England, and no steps worthy of note had been taken to check the mortality. For London alone in that year no

fewer than 27 deaths were reported as due to the bites of rabid dogs. A muzzling order was then enforced, and at the end of 1886 not a death was recorded. Unfortunately, the order prescribing the use of the muzzle was then rescinded, and in a few months a case of hydrophobia occurred in the south of London, soon to be followed by others, and in 1889, 10 deaths were registered. In July of that year the muzzling order was again issued and stringently carried out, and rabies and hydrophobia once more disappeared.

For absolute public safety the following measures are suggested: (1) To place the city dog handling under proper medical or veterinary jurisdiction; (2) to prohibit all dogs from running at large unless muzzled or, at least, muzzle all dogs in infected areas; (3) to provide separate compartments in the wagon and at the pound for each dog; (4) to provide safe and proper places for the keeping of dogs suspected of having rabies, especially if they have bitten other dogs or a person; (5) every dog bitten by a rabid animal should be destroyed or quarantined for at least one year.

BEST METHODS TO PREVENT HYDROPHOBIA.*

BY FOLLEN CABOT, M.D.,
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HYDROPHOBIA is rarely seen in man, but commonly seen in animals, more particularly in the dog.

The disease is one about which much ignorance exists in both the mind of the physician and the layman. On this account, we are greatly handicapped in our efforts to stamp out the disease. Few physicians ever see a case of hydrophobia, and as a consequence, many medical men even doubt its existence. Such a belief adds to the confusion and occasionally does irreparable harm.

We have in hydrophobia a disease as well established in its etiology and symptomatology as is typhoid fever. Until we gain an intelligent understanding of the disease, particularly its prophylaxis, we can accomplish little.

In the prevention of hydrophobia we have three distinct lines to work in: *First*, intelligent laws in regard to animals, particularly dogs; *second*, treatment of the injury by antiseptics and cauterization; *third*, Pasteur method of producing immunity.

We must bear in mind the fact that an animal develops rabies only after a bite by a mad animal. The disease never develops spontaneously in either man or animal. The season of the year bears no relation to the prevalence of rabies. In some statistics, recently gathered, the winter months showed the largest number of cases of rabies. This fact is quite contrary to the popular belief that summer is the season of the year to look out for mad dogs. Upon this erroneous theory many of our dog laws are based. For in-

stance, in New York, dog catchers go out with great enthusiasm and capture stray dogs, beginning May 1 and continue to do so during the hot months. If we make laws which can be carried out all the year round, much good will follow. No dog without an owner should be allowed for a day in New York City. This matter of catching and mercifully disposing of dogs should be put in the hands of the city and vigorously and intelligently enforced every day in the year. We would soon reduce the enormous number of homeless and half-starved dogs seen in the city streets to-day. Every owner of a dog should be compelled to register his dog with a bureau for the purpose, and each dog should be quarantined for at least six weeks after being brought into the city. I believe that muzzling all dogs for six months would at present be desirable; but I do not believe it would be necessary to have such a law continued beyond the six months. In England, by a strict quarantine law against rabies, in one year the disease was reduced in dogs from several thousand cases to nine. There, dogs are absolutely quarantined by government officials for six weeks, and partially so for six months. This record shows what a strict law will do. It is erroneous to suppose that furious rabies is the usual form in dogs. Dumb, or paralytic rabies, is the usual type seen in New York to-day.

The treatment of a bite of a suspected animal is of much importance. If the bite is on the face, it is most serious; other exposed parts of the body, as the hands and arms, are next in importance. The microorganism of rabies, I believe to be fermentive in character, lying localized for at least twenty-four hours, and then infecting the system by way of the nerves and not directly by the blood. The extent of the wound has much less significance than its position and after-treatment. A wound no deeper than a pin scratch may be the cause of an infection. In 3 cases of hydrophobia out of 6 I have had under observation, the wounds were the merest scratches.

In cases of wounds about the face and exposed parts, the patient should be put under a general anesthetic, if necessary, and the wound scrubbed out with a brush, first with green soap, then with bichloride of mercury 1 to 1,000. This should be done as if for an operation. After this, fuming nitric acid should be carefully applied by means of a pointed glass rod. The wound should then be dressed surgically. If no anesthetic has been given, I usually use first cocaine after the scrubbing, then pure carbolic acid followed by fuming nitric acid. This must be done as early as possible; but I have demonstrated by careful experiments with guinea pigs that it is of value even as late as two days. At the end of twenty-four hours I have shown in a large number of guinea pigs that this method will save 91 per cent. of infected cases. If we cannot obtain nitric acid, the actual cautery is next best. It is, however, difficult to see each small point while using

* Read before Bellevue Alumni Society.

this agent. Nitrate of silver, which is so popular, saved only 55 per cent., and therefore should not be used. However, simply cleansing and scrubbing out the wound with soap and water had some effect, saving 31 per cent. of guinea pigs infected with rabic virus. In my series of experiments I found that about 13 per cent. of control animals infected with the virus did not develop the disease. This fact must be remembered, but it does not affect the general result of the experiments.

Treatment, therefore, of the wound, even at the end of forty-eight hours, is of distinct value, and when done within twenty-four hours, and properly done, I believe it to be of more value than the Pasteur method of protecting the system against possible infection. Both methods, however, should be used.

The dog in every instance should be preserved alive, if possible, and kept under observation for a week. Then, if it remains well, there is no danger. If the dog dies, the brain should be preserved for examination and inoculation tests with guinea pigs.

The Pasteur method of protecting the individual against hydrophobia was at first much opposed by the medical profession, but is now generally accepted and is no doubt of much value if begun early.

I shall not describe the Pasteur treatment here beyond saying that it usually lasts from fifteen to twenty-one days, according to the position of the wound and the interval elapsing between the time of the injury and beginning of treatment.

The preliminary treatment of the wound also is taken into consideration when deciding upon the number of Pasteur injections. Children seem more susceptible to the disease, perhaps because they are more commonly bitten in the face.

In closing, I make a strong appeal to the medical profession to study the subject more thoroughly and to act promptly in the preliminary treatment of injuries. But in case the disease develops, never give up hope, as a case has been known to recover. Gowers has reported one and I believe it to be a possibility.

In instances where the disease develops we must prevent the patient from suffering. This can be done by general anesthetics, chloral and morphine. The patient should not be allowed to suffer.

Brucine in Chronic Morphinism.—After having had unsatisfactory results with strychnine in morphine-habit, A. FROMME (Münch. med. Woch., July 7, 1903) resorted to brucine with much better success. One of two ways may be employed: either brucine is given internally in gradually increasing doses while the hypodermic dose of morphine is slowly diminished, or else both drugs are given internally. Not only does the brucine increase the solubility of morphine in the system and thus ensure absorption of the hard infiltrations at the site of injection and more rapid excretion, but it also stimulates circulation and digestion, prevents destruction of the red corpuscles and promotes sleep. The second method is generally to be preferred, since the use of the syringe, in itself an attraction, is at once done away with.

ADENOIDS, IN RELATION TO AUDITION AND CEREBRATION.*

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SINCE the attention of the profession was called to hypertrophy of the pharyngeal tonsil, the subject has received much consideration and the literature is now voluminous.

In spite of all that has been said and written, there are still many physicians who are not informed as to the remote results of neglected adenoids, and permit children entrusted to their care to mature with incurable defects, which could easily have been prevented with the proper care in childhood.

To one of these—Disease of the Middle Ear—I wish specially to call your attention, and if in what follows I succeed in impressing upon you the importance of these growths as a causal factor in tubal and tympanic diseases, my time will have been well spent. That inflammatory or other obstructive conditions in the nasopharynx have an injurious effect upon the middle ear, is now universally acknowledged by all who are best qualified to judge. If we consider the anatomical relation of these growths, located as they are in the vault and along the posterior wall of the pharynx, filling the space between the Eustachian cushions, blocking the posterior nares and mechanically obstructing free nasal respiration, it should be an easy matter to understand the pathological relation between these and conditions affecting the auditory apparatus. Lymphadenoid disease is usually found in its highest stage of development during childhood, and in some cases is said to be congenital. This is accounted for by the fact that in children all gland structures are more prone to take on pathological changes, and in this particular region are stimulated to greater activity by the local inflammatory process accompanying the acute exanthemata in children. Now add to this the relatively small space in the pharyngeal vault of a child, and we have a picture which cannot fail to impress upon the minds of careful observers the importance of this condition as an etiological factor in diseases of the middle ear and also its influence in aggravating a diseased process already begun.

All investigators and writers on the subject give prominence to the occurrence of ear complications in adenoid disease. It is my opinion, based on observation and clinical experience, that *lymphoid tissue in the pharynx is the most important predisposing factor in acute and chronic suppurative and non-suppurative otitis media and recurring earache in children.* Indeed, the effect of lymphadenoid disease upon the function of hearing begins in childhood, increasing to ado-

* Read at the Annual Meeting of the Jefferson County Medical Society.

lescence and old age, until in many cases audition is almost destroyed.

How are these effects produced and what is the result on the growing child?

It is now quite generally conceded that any cause which interferes with free nasal respiration will in time produce impaired hearing. As a result of obstruction to the passage of air through the nasal chambers, free ventilation of the pharyngeal vault is interfered with, which necessarily produces a rarified condition of the air in this region. Reduction of air pressure is followed by a passive congestion and hyperemia of the mucous membrane, extending through the Eustachian tube to the middle ear. Following this there is swelling of the mucous membrane encroaching upon the caliber of the Eustachian tube, and interfering with ventilation of the middle ear, resulting in depression of the tympanic membrane. This limits the excursion of its vibrations and impairs the function. It is very easy to understand that an inflammatory process can readily be engrafted on a mucous membrane in such condition, and it is a fact of common observation that it does occur in a large number of these cases. Now, as an almost invariable law, where we have a catarrhal inflammation of the middle ear with hypersecretion, it sooner or later becomes infected and we have a suppurative process set up, which in consequence of the closure of the Eustachian tube due to the obstruction in the pharyngeal vault, is very apt to become chronic, carrying with it the possibility of a number of serious and often fatal complications. The location of the growth is important as a determining factor in ear complications. Adenoid tissue situated between the Eustachian tubes, although small in amount, is of far greater danger to the ears than a very much larger amount limited to the upper and posterior portion of the vault. A large percentage of children with adenoids become deaf, in fact, it is one of the most frequent causes of chronic "running" ears in young children. The result of these influences upon the development of the child is unfortunate in the extreme. These children are mentally deficient. A plausible explanation of which is found in the close anatomical connection between the veins of the nose and anterior lobes of the cerebrum. The venous congestion of the nasal chambers, always present from obstruction to nasal respiration, may induce a corresponding congestion in the anterior portion of the brain. The obstruction which these growths offer to the return of lymph from the brain may also act as a contributing factor. The great increase in the mental ability of some children immediately following a thorough removal of the growth goes a great way in substantiating the truth of the obstructive theory. There can be little doubt, however, that the stupidity is made more manifest from lack of attention than from deafness. It seems unnecessary for me to add that the restless and unrefreshing sleep, imperfect blood oxidation and impaired general nutrition, from which

these cases usually suffer, are of more than ordinary importance in the physical and mental development of the individual. Children with adenoids are soon fatigued by mental work. The reproach and punishment, ridicule and censure to which the child is subjected in consequence of its deafness are very important factors in determining character.

The writer has tried to indicate in as brief manner as possible some of the conditions dependent upon lymphadenoid disease of the pharynx and call attention specially to its influence upon audition and cerebration, and to show that the mental growth of a child is commensurate with the state of healthful nutrition and physical vigor and point out why the disease under discussion lessens the vital powers and weakens the whole organism. The almost invariably rapid recovery and favorable effect upon the hearing and intellectual field from thorough surgical removal should impress upon us the importance of early operative interference.

CHRONIC LEG ULCERS.

BY F. WARD LANGSTROTH, JR., M.D.,
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THIS article is intended to outline a few methods of treatment that have been found effective, and to point out some mistakes to be avoided.

It is first necessary to consider some of the etiological factors concerned in the production of chronic leg ulcers, because the treatment will be found to depend very intimately on the factors active in producing the condition. The causes are given in the order of their frequency, based upon the records of almost two hundred cases, personally observed:

1. Varicose veins are by far the most frequent cause of this condition, and these may be divided into three classes:

(a) After varicose veins have existed for some time, and especially as the subject nears the later years of life, there appears a certain local dyscrasia in the affected leg. This dyscrasia is due, not only to the defective nutrition, resulting from the lack of pure blood and the removal of waste products, but also because the edema, usually accompanying large veins, tends to the production of an excess of fibrous tissue in the parts. A further loss of normal cell vitality is thus caused, due to a consequent pressure atrophy induced by the combined action of the pressure exerted by the edema and by the contracting fibrous tissue. Now, when an infection takes place in this particular devitalized tissue, either from excoriations produced by scratching eczematous areas, which so frequently accompany this condition; or from slight traumatism, it does not spread rapidly, but finds its field of action prohibited by this excess of fibrous tissue and defective cellular action. The process spreads slowly, and the same causes which prohibited its rapid extension also interfere with its ability to heal rapidly. And the chronic, slug-

gish leg ulcer results. (b) In younger subjects, where the varicose lesions have not existed so long, the chronic condition results from a primary acute ulcer. Infection takes place, and finding the tissues and circulation in a more nearly normal condition, spreads rapidly. A tissue reaction starts at once to overcome the invasion. A small round cell infiltration actively walls off the infected area and there results, by a process of proliferating embryonic tissue, a resultant fibrous tissue, which is produced by the struggle of the cells against the active spread of the infection; thus becoming the ultimate factor in producing the change from an acute to a chronic ulcer, in this second class of cases, because as the fibrous tissue contracts it shuts off, to that extent, the blood supply of the parts it surrounds. And so the formation of new tissue to take the place of that lost during the active process is prevented and thus a chronic ulcer is established. We do not consider that in this class of cases the veins take a very active part, except in the later stages, as the above condition may be aided because of the sluggish state of the superficial circulation. (c) In phlebitis and periphlebitis, which two conditions usually exist together, either one may occur as the primary state, the other following by reason of the diffusion of the inflammatory condition through continuity of tissue. An ulcer results when suppuration involves the cutaneous surfaces, and may resemble either one or the other of the above-mentioned forms.

2. In syphilis, we must confine ourselves to late ulcerative skin lesions of the lower extremity and gummata of the same, which result in suppuration and accordingly form ulcers. The latter are the most frequent and, of course, both are chronic.

3. Trauma when engrafted upon varicose veins very frequently results in the formation of chronic ulcers. That an ulcer resulting from traumatism in the absence of varicose veins is usually of an acute nature seems capable of ready explanation if the ideas expressed in the above paragraphs are acceptable.

4. Tuberculosis and leprosy, in this country at least, are comparatively rare, and could be more readily considered under chronic inflammations of the skin.

Let us now consider a few simple rules to be observed in the treatment of chronic leg ulcers: (1) Insist on the importance of a proper differential diagnosis, in which practitioners would seem to fail or at least to consider it of no value; (2) avoid all ointments and pastes, relying on aseptic or oftentimes in this condition antiseptic forms of treatment; (3) consider always local and general constitutional treatment; (4) do not despair. The ulcer that absolutely refuses to heal is exceedingly rare.

To continue this for the special treatment: In varicose ulcers we should remove as far as possible the cause. The radical and palliative treatment of varicose veins can be found described in all text-books of surgery. We, therefore, men-

tion here only two measures that can be adapted, and thus indicate their usefulness. (a) Radical operative procedures, as just stated, are to be found described in text-books of surgery, but in no case do we think operation should be considered until the ulcer is entirely healed. (b) Bandaging, then, is the only means left by which we can control the causative factors in this class of cases. This is one of the most useful and in fact all important means of treatment. In no case use any form of elastic bandage or stocking while ulcers exist; because all such means of support cause to some extent an excess of heat and irritation of the parts. Unbleached muslin bandages $2\frac{1}{2}$ to 3 inches in width and 7 to 8 yards in length are the best. In their application do not resort to a spiral reverse on the leg, for while it gives the most equal pressure, it invariably refuses to remain long in place. A properly applied figure 8 of the foot and leg, making all pressure on the up-turns, gives the best results.

In very sluggish ulcers, curette the surface and incise the edges. In the first class of varicose ulcers, the incision going well through the fibrous edge is amply sufficient for its mobilization. In the second class, where the ulcer is bound down and almost immovable, deep elliptical incisions must be made around the parts in order that they may become movable. These procedures must be accomplished under aseptic or antiseptic precautions, and the parts subsequently dressed for twenty-four hours with a saturated solution of boric acid in water, or hydrargyri chloridum corrosivum, 1 part to 10,000 of water. The purpose of these incisions is twofold (1) by cutting the fibrous tissue to allow the formation of new capillaries, which may supply the parts with blood; (2) by cutting the fibrous adhesions to allow the ulcer to contract toward its center.

Considering this to have been done, or, in the absence of its necessity, let us now resort to stimulating treatment. There are several solutions which lend themselves especially to this purpose. Ointments, except for rare cases, are to be avoided. Many of them are not aseptic. They prevent free drainage, which is bad, as ulcers are only indolent wounds. The bases of ointments, in fact any grease, are not conducive to the formation of granulation tissue, and their removal is likely to destroy as much of the new growth as could have formed since their previous application.

Solutions applied to the ulcers, on sterile gauze, will be found, in almost all cases, to be the better form of treatment. Let us then consider some of these solutions, each one to be mentioned in its order, being a little more stimulating than its precedent. Their formulæ will be given at the close of the paper.

A saturated boric acid solution is useful in those cases which readily become inflamed, but it is rather too mild for use in the majority of cases. (It must be remembered here as elsewhere that we are considering only chronic ulcers. Acute ulcers of course deserve very different treatment.)

Alum acetate in saturated solution is useful in

chronic cases that have become suddenly inflamed.

A 5-per-cent. to 10-per-cent. solution of ichthyol in water lends itself to the same uses.

Chronic ulcers must be stimulated in order that they may heal. In other words, more blood must be brought to them and all necrosed tissues and infective agents removed.

Red wash seems of especial value to bring about these results, and, applied every day, usually produces most marked changes in the character of the wound. Its use, however, must be attended with care, since in a few cases it will be found too active. It will then be well to alternate it with some washing preparation.

Balsam of Peru gauze will be found very efficacious, especially if alternated every few days with the above-mentioned wash. This gauze causes rather finer and apparently more resisting granulations than most other forms of dressings.

Stimulation may also be brought about by some of the milder caustics used at the time of dressing and followed by boric acid solution or some mild form of application to be left in place for twenty-four to forty-eight hours.

For this, a saturated solution of potassium permanganate may be painted over the ulcer, and this washed off with hydrogen peroxide, followed by sterile water and the dressings of boric acid then applied. This must not be used more frequently than every fourth or fifth day, and often causes some pain. Nevertheless, it is attended by most gratifying results in many cases.

Silver Nitrate.—The better employment of this remedy is by brushing over the wound surface with a solution of 40 grains of this substance in an ounce of water, or by touching the granulating surface with the stick. This may or may not be washed off, and is to be followed by a wet boric acid dressing.

One or two weeks of such treatment usually shows a marked decrease in the size of the ulcer and improvement in the character of the granulations. It may now be necessary, if the ulcer has again reached a stage of sluggishness, to repeat the incisions around the edge to again start the closing in of the ulcer.

In many cases it will be found necessary to treat the surrounding skin for inflammatory conditions. To best accomplish this, gauze pads saturated with some of the above solutions are placed over the ulcer and then the whole covered with lint upon which is spread such ointment as the cutaneous condition suggests. Lassar's paste is especially valuable.

Rest in bed with elevation of the part is often of advantage, but should only be used as a last resort if the patient is dependent upon his mobilization for his support.

Massage and douches of alternate hot and cold water are useful in all cases. Later, when the ulcer becomes healthy and the granulations reach close to the surface the parts may be strapped with strips of zinc oxide plaster, three-fourths of an inch wide, applied alternately from opposite

sides, beginning below and extending well above the ulcer and not allowing the ends to meet within an inch or more. These may be left in place for a week or ten days and give very pleasing results.

Skin grafting is performed in some cases, but the results are inferior to those of the same procedure in case of burns and more acute conditions.

After a cure has been effected, a Randolph elastic bandage should be worn indefinitely and the leg doused with cold water and rubbed with alcohol every night and morning.

Constitutional treatment consists in hygienic measures as regulative of the diet and bowels and the treatment of other chronic disorders. Tonics containing iron, arsenic and strychnine are valuable, as they stimulate the circulation, improve the quality of the blood, and the arsenic often removes the eczematous tendency which frequently precedes or accompanies the ulceration.

Syphilitic ulcers respond readily to any form of local treatment if they are recognized as such, and active constitutional treatment is carried out. Creolin solution (a half ounce to a pint of water) is, however, especially useful in these cases for overcoming the odor and removing the slough.

In conclusion, let us say that even after large and careful experience, a line of treatment cannot always be selected at first to suit the case in hand, and it is often necessary to change the agents employed, and at times have recourse to ointments and various soothing and astringent dusting powders.

FORMULÆ OF SOLUTIONS.

Red Wash—

Zinci sulphat..... dr. 1
Tinct lavandulæ Co..... oz. 4
Aque q. s. ad..... pts. 2

Lassar's Paste—

Acidi salicylici gr. 15
Amyli
Zinci oxid aa. dr. 2
Petrolat q. s. ad..... oz. 1

Balsam Peru Gauze—

Alcohol oz. 1
Balsam of Peru..... oz. 2
M. et Pour on gauze strips.

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SOME PHASES OF CRANIAL SURGERY.*

BY GILBERT GEOFFREY COTTAM, M.D.,

OF ROCK RAPIDS, IOWA.

WITHOUT attempting to cover more than a mere fraction of the ground now occupied by cranial surgery I wish to invite your attention to a few points that may prove of interest at this time.

We realize to-day, more than ever, that the complex anatomy and the incomplete knowledge of the physiology of the brain, coupled with the element of uncertainty of diagnosis and operative result, all conspire to make the study of this

* Chairman's Address, Section on Surgery, delivered at the Fifty-second Annual Meeting of the Iowa State Medical Society, held in Sioux City.

branch a most perplexing matter and these features also explain why more headway has not been made and why the field is an unattractive one for the dilettante or the sensationalist.

To learn what to unlearn has, indeed, been one of the hardest problems for investigators to solve and the results have become evident by the fact of there remaining more shattered ideals in the form of rejected fundamental teachings and abandoned operations than in any other branch of operative surgery.

This, however, is true progress. The utter refusal of the present age to be bound down by fallacious tradition has produced remarkable changes within the generation and promises well for the future, but we must not blind ourselves to the fact that, in brain surgery especially, much that we are prone to regard as proven and permanent to-day may to-morrow be ruthlessly condemned. The logical deduction from this is that the work of to-day should rest on a surer foundation and that we should profit by the mistakes of yesterday.

If we carefully analyze the history of the recent past, to say nothing of more remote times, we cannot fail to be impressed with one especially notable fact, namely, that experimental procedures unsupported by a sound pathology have invariably been unproductive of results and, per contra, wherever pathological conditions have received a correct interpretation, there have followed the permanent advances, in cranial surgery. Let me cite examples. Of the pathology of epilepsy we know nothing, but when the era of clean surgery was inaugurated and cerebral localization began to be a little understood it was thought well to revive the ancient operation of trephination for this condition, removing the so-called epileptogenic center in the true Jacksonian, or the depressed area in the traumatic, cases. The immediate results were encouraging, but it has come to be known that almost any operation on the cranium will cause temporary improvement in an epileptic, only to be followed by relapse later, and such proved to be true in this connection. Then a flank attack was made by Alexander, of Liverpool, who, proceeding on the theory that an increased blood supply was responsible for the cortical irritation, sought to diminish it by ligation of the vertebral arteries. This also failed. Later, Chipault, assuming that cerebral anemia was the causative condition, advocated excision of the cervical sympathetic ganglia, for the purpose of augmenting the supply of blood to the brain and this, too, after attracting some attention, fell into disrepute. The three-year limit has been the Waterloo of all operations for epilepsy up to the present time and the results show that it is useless to proceed further until we know something of the real nature of the affection itself. This applies to microcephalus, hydrocephalus, idiocy and general paralysis of the insane, the pathology of which we either know nothing of or else have learned enough about to indicate that the operations devised for their re-

lief were based upon faulty deductions and have therefore very properly been abandoned.

It may, then, very pertinently be asked whether our incomplete conception of the pathology of the central nervous system constitutes the only barrier to progress in its surgery and we must admit that there are other factors to be reckoned with. Of great importance is the matter of cerebral localization, upon which so much light has been shed in the last thirty years and of which so much remains yet to be revealed. It is true that the function of a large part of the cortex has been accurately mapped out in the physiological laboratories. It is also a fact that comparatively little of the knowledge so acquired is available for practical purposes and to harmonize the pathological conditions with the clinical manifestations is one of the unsolved problems of the present which we hope the future will explain. It is coming to be recognized that injuries severe enough to produce focal symptoms at all are generally accompanied by sufficient laceration of the surrounding and distant brain substance, with resultant hemorrhages of various degrees, to render a localizing diagnosis impossible. Krönlein says "In complicated cases without history the surgeon is glad to make a diagnosis in general, or to know on which side to trephine."*

In abscess or tumor cases the same difficulty may be met with owing to the very gradual enlargement of the lesion and consequent adaptation of the brain to the increased pressure. Irradiation fractures, causing hemorrhage on the opposite side from that upon which the injury was inflicted—the modern view of the old *contre-coup* theory—may also prevent a localizing diagnosis by the fact of total paralysis being thus produced. A typical instance of this came under my observation ten years ago. The following is a brief history of the case. A heavy, middle-aged teamster fell from his wagon, striking the posterior part of the right lateral surface of his head upon the hard ground, sustaining a depressed fracture of the posterior lower one-fourth of the right parietal bone, becoming totally paralyzed and comatose forthwith. A large flap was turned back and the fragment elevated. There was slight temporary relief, but the grave symptoms soon recurred and death ensued within forty-eight hours after the injury. At the post mortem it was found that the fracture had followed the lambdoidal suture around the back of the skull to the opposite side until it reached the asterion, when it divided into two branches, the upper of which terminated just anterior to the zygomatic tubercle, the lower again dividing into two branches which ended in the mastoid process. On opening the skull it was found that the left lateral sinus had been ruptured by this fracture, producing a large subcranial hematoma which extended as high as the superior temporal ridge, while under the dura of that side was another

* Quoted by S. C. Plummer in "The Hartley-Krause Flap in Hemorrhage from the Middle Meningeal Artery," *Annals of Surgery*, Vol. XXXVI, p. 597.

large accumulation of blood, covering the entire hemisphere of the brain.

Lesions in the frontal cortex are devoid of special localizing symptoms, but suppuration in this region may be accompanied by marked cachexia, of which the following case is corroborative: A. B., a boy aged seven years, was kicked in the right fronto-parietal region by a horse, receiving an open fracture close to the pterion and became immediately comatose. The wound was stitched and dressed antiseptically by the attending physician. Coma continued for two days. On the third day measles developed. Recovery ensued without further incident until four weeks after the accident, when the patient began to complain of frontal headache, vomiting at times. The temperature became irregular and occasionally attacks of spasmodic convergent strabismus were noted. There was marked emaciation, with anemia. Seeing him in consultation at 3 A.M. five weeks after the receipt of the injury I found the temperature 98° F., the pulse 110; patient restless but rational and complaining of frontal headache. He was much emaciated. There was no ocular irregularity and the fundus was not examined. The site of injury was tender on firm pressure; the original wound in the scalp was entirely healed. On turning down a large flap a fragment of bone measuring three-fourths by one-half inch was found driven into the brain substance and under it about two drams of pus, which spurted out with some force on removal of the fragment. The opening in the skull was enlarged with rongeur forceps, the flap replaced and efficient drainage provided for. The patient succumbed to pulmonary edema eight days afterward, and no autopsy was performed.

These cases are simply types illustrative of the fallacious import of localizing symptoms. Realizing this, it becomes necessary to consider the only other available method of diagnosis, exploratory operation, and I think that it will be freely conceded that the development of our present technic makes this a much less formidable undertaking than heretofore. By means of the osteo-tegumentary flap it is possible to make the necessary investigation of the suspected area and afterward secure a satisfactory adjustment of the anatomical relations involved. If necessary the entire motor area of one side can be explored through one flap without compromising the subsequent integrity of the coverings. The methodical exploration of the brain for fluid can be carried out either by Fenger's canulated sounds, or better by the use of a thin, slender spatula, which may be inserted in every direction and is equally serviceable to detect the presence of new growth or fluid.

It is well to observe, in this connection, that chemical antiseptics have no place in brain surgery, but the most rigid asepsis is even more essential than in abdominal operations, where we have a peritoneum to cover a multitude of sins. Prolonged exposure of the brain, too, is likely to prove disastrous by the production of profound shock and must always be avoided. The recent

work of Horsley and Macewen in the removal of growths in two stages affords a valuable suggestion for the prevention of shock. If we read between the lines of many reports of cerebral operations we cannot but conclude that the patient's welfare would often be better subserved did the operator content himself with trying to do less. I believe that this applies with especial force to the management of open, or compound fractures.

The objects here to be accomplished are: (1) limitation of infection, (2) hemostasis and, (3) relief of pressure. If all of this can be done, as is frequently the case, through the original opening, what is to be gained by systematically performing trephination in each and every case, as so many text-books direct? This point was brought forcibly home to me in a case which had to be treated in very unfavorable surroundings, causing me to hesitate over the question of doing a radical operation and finally deciding in the negative, although the injuries were such as under ordinary circumstances are usually taken to warrant operative interference. The history of the case is as follows: Mrs. M. R., aged twenty-five years, was struck several times on the head with a dull-edged hatchet, rendering her unconscious at once. The head being shaved, I found four separate and distinct open, depressed fractures, one being situated on the sagittal suture midway between the glabella andinion, another about one inch to the right of the external occipital protuberance, the other two close together near the left squamoparietal suture. The fragments were driven through the dura into the brain in every instance except the first mentioned, which was in the superior longitudinal sinus. The removal of all the fragments was done by means of a narrow-bladed forceps and the edges of the openings in the skull carefully examined for depressed pieces, which were elevated in like manner. The wound in the superior longitudinal sinus bled furiously on removal of the fragment; this was controlled by gauze packing, which is the proper and only method of dealing with injuries of these vessels. The other openings were all drained without suturing. Hot sterile salt solution was employed throughout to wash away débris, etc. The patient made an uneventful recovery.

Under no circumstances should the scalp in an open fracture of the skull be stitched when such stitching interferes in the slightest degree with the freest possible drainage. The teaching of some writers that the proper practice is to convert them into closed or simple fractures at once is absolutely pernicious. Every accidental open wound must be regarded as infected and we have no right, in the present stage of our knowledge, to assume otherwise.

Before closing, permit me to plead for the utmost simplicity of technic in all operative procedures upon the cranium and its contents. There is a tendency nowadays to introduce a bewildering array of new and modifications of old appliances into surgical work, not one in twenty of them of any real practical utility. The trephine

is, of course, obsolete and merits no place in a modern surgeon's equipment; its place has been taken by the chisel, the rongeur and the DeVilbiss device. With these, in practical hands, any modern surgical procedure on the skull can be executed. They are inexpensive, can be carried anywhere and may be adapted to other purposes. They do not get out of order, like surgical engines, nor break, like Gigli wire saws. It is quite unnecessary to adopt Schäfer's method of controlling hemorrhage from the scalp by an encircling rubber band; such few vessels as bleed are better caught up at once by hemostats, which then hold down the flap by their own weight and obviate the necessity of an assistant with a retractor. Again, too, would I put in a word for the osteotegumentary flap, it being the simplest method of entering the skull for the relief of middle meningeal hemorrhage, growth or abscess of the brain, or for purely exploratory purposes.

MEDICAL PROGRESS.

MEDICINE.

Aortic Insufficiency after Trauma.—Severe injury may result in the rupture of an aortic valve where atheroma is present, but it is less commonly known that the same may occur in perfectly healthy valves. Aortic insufficiency follows, but extensive vegetation at the tear may also narrow the orifice. It is generally stated that an exceedingly loud and rough murmur speaks for a traumatic etiology in doubtful cases but this is not always so, according to T. STRUPPLER (Münch. med. Woch., July 14, 1903) who gives the detailed history of a case with a very indefinite murmur. Sometimes, on auscultation, no murmur can be heard at all.

A Case of Portal Thrombosis.—As in most cases of portal thrombosis, the one published by O. SCHULZ and L. R. MÜLLER (Deutsch. Arch. f. klin. Med., vol. 76, No. 6) was of unknown etiology. A constantly recurring ascites, which required frequent tapping was the prominent symptom. Since the patient did not lose any weight despite the large amounts of albuminous fluid which were removed, the fluid itself as well as the organ after death were studied exhaustively. It was found that the secretion of bile does not suffer in portal occlusion, nor are the liver cells changed pathologically, though the entire liver is smaller and its connective tissue proliferated so as to give the organ a lobulated appearance. Where anastomosis between the general and portal systems is insufficient, as in this case, marked ascites follows. But the transuded fluid is not entirely lost for the organism; it is an interesting fact that the parietal peritoneum and the peritoneal coat of the liver undergo extensive changes whereby an increased absorption of the nutritious fluid is possible, thus permitting the patient to remain in comparatively good condition for many months. These changes manifest themselves macroscopically in thickening and microscopically in proliferation of the capillaries, small veins and lymphoid cells in the subperitoneal connective tissue. These alterations are typical for portal obstruction and do not occur in ascites due to general venous stasis. The amount of nitrogen in the fluid was influenced to a certain extent by the character of the food; thus the amount of albumen in 25 liters could be made to vary from 177 to 335 grams. Certain extractives of unknown composition were also present whereas urea,

albumoses and peptones occurred only in traces or not at all and the amount of sugar was never more than a few tenths of one per cent. Albuminous food diminished the amount of fluid transuded and vice versa and by restricting fluids, the next puncture could be postponed for a few days.

Arterio-sclerosis as a Cause of Nervous Disease.

The frequent presence of arterio-sclerosis as a cause of apoplexy is a matter of common knowledge but it is not as generally realized that many of the temporary and apparently neurasthenic symptoms which occur in men of middle age have also an organic basis in the sclerosed condition of the blood vessels. M. A. STARR (Med. Rec., July 4, 1903) believes that too little attention has been paid to this causal factor of nervous disturbances and a warning of more serious trouble is frequently disregarded until too late. Most commonly a disturbance in the mental action is first noticed which the patients describe as dulness or hebetude. Difficulty in clear thinking, an irritability of temper and lack of control of emotions are manifested. Others complain of temporary sensations of numbness, irregular darting pains, ringing in the ears or a sudden dimness of vision being not uncommon. Thus it is always advisable to examine closely the arterial system of a middle aged man complaining of these indefinite and apparently neurasthenic symptoms. Furthermore, the condition of the vascular walls has an important etiological relation to various spinal cord lesions among which may be mentioned anterior poliomyelitis, bulbar paralysis and ophthalmoplegia. Although most of these cases are infectious in origin, nevertheless vascular disease has been found to be the basis of the lesion by various investigators in the more unusual forms of the disease. Myelitis and combined sclerosis have also been recently found apparently secondary to vascular changes. Diseases of peripheral nerves are also occasionally due to endarteritis in the small vessels which accompany them and neuralgias may frequently be brought into the same category. It is not intended to urge vascular changes as the usual or important cause of these affections but that they should not be overlooked as an occasional factor. In the treatment of these various conditions drugs never seem to be of much permanent use. General hygienic and dietetic measures are as a rule more efficacious. A great variation in the pulse tension is frequently noted and the author believes that there is an internal secretion which regulates this tension. His observations upon many cases of Basedow's disease and myxedema have led him to the belief that the secretion of the thyroid gland exerts a very marked influence upon the pulse tension. The pulse is invariably soft in Basedow's disease in which there is supposed to be an excess of this internal secretion and he has repeatedly noted the constant therapeutic effect of the administration of thyroid extract in lowering tension. Thus in conditions of temporary high tension great benefits are obtained from its use and no matter what the underlying cause may be the effect seems equally reliable. In various cases of migraine and in those conditions of vertigo, headache and confusion of mind which attend a high-tension pulse, and which are associated very often with a lithemic state the addition of thyroid extract to other remedies will give marked relief. For continued use also, when the tension is more constant, the thyroid extract seems to be more beneficial than nitroglycerin.

Increasing and Diminishing Body Weight.—The frequency with which the physician is consulted with the hope of rectifying an extreme condition of body weight in either direction not due to pathological causes makes this subject a very important and interesting one. M. EINHORN (Med. Rec., July 18, 1903) enters into the consideration of the amount of food necessary

for the ordinary maintenance of the body weight and the supply of energy for the daily work. It was formerly supposed that the more food supplied to the animals organism the more material was burned up. It has frequently been proven, however, that the organism does not burn up food introduced in excess but rather utilizes it and converts it into fat. On the other hand, the body consumes just as much material even when no food is taken, using up its own substance, fat and muscles. It therefore follows that the amount and kind of food ingested is the prime factor in the solution of this problem. Leanness is met with, although rarely, in persons who are perfectly healthy. They are usually of a vivacious temperament doing a great deal of work and eating only moderately. To increase the body weight one should inquire minutely how the patient has lived, what kind of food and how much he has taken with every meal. A diet list should include as great a variety of food as is compatible with the condition of the case. If the amount of food ingested be sufficient the beverages taken with the meals should be more nutritious. Less coffee and tea and more milk and cream should be taken. Two or three light extra meals may be given with advantage. About one quarter pound of butter should be taken daily. Butter is an easily digested fat and on account of its high caloric value is especially suitable. When the appetite is poor it will generally be found that bread and vegetables as well as milk and eggs can be taken even if a dislike for meats exists. The addition of olives, lettuce and horseradish sometimes increases the desire for meats. A glass of water stimulates the appetite while eating and induces a larger consumption of food. Outdoor life and moderate exercise are of value for the appetite is thus improved and by satisfying it the increased loss of heat through muscular work will not only be compensated but probably an excess of food will be ingested without trouble. To reduce body weight two methods are possible, diminution of the amount of food taken and second, increase of amount of work performed. A rapid and safe method is that suggested by Weir Mitchell who advocates that the person be placed on a diet of skimmed milk alone, with the usual precautions, or at once give skimmed milk with the usual food and in a week put aside all other food save milk and all other fluids. When the amount of milk necessary to maintain the weight is determined it is gradually diminished until the patient is losing a half pound a day unless the decrease is not well borne. Considerable rest in bed is necessary when so rapid a loss is desirable, massage and Swedish movements are also beneficial. Oertel and Zuntz depend largely upon the increased amount of work done. By carefully regulating the amount of work done and the food ingested the regulation of body weight can be controlled to a great extent even when the daily work of the patient is continued and when recourse to these more rapid methods is impossible. In increasing the work the patient should never be allowed to become exhausted. The accelerated heart action and respiration due to the exertion should return to normal ten minutes after beginning to rest. Thus it will be seen that harmful and, at least, very annoying conditions of the body may usually be entirely cured if these simple means (diet and muscular work) be carefully studied and regulated.

A Case of Syphilitic Polyarthrits.—The patient dates the primary lesion from five years ago. The course of the disease did not seem to be typical, although the diagnosis is undoubted. A few months before admission to the hospital there appeared suddenly pain in the left great toe, and in the left sole; the next day the pain spread into the ankle of same side; in a week the knee-joint was attacked. The pains were es-

pecially aggravated at night. Later on the right knee was invaded. Treatment for "chronic articular rheumatism," though energetically applied for a long time, failed to produce any results. The epiphyseal ends of the bones at the attacked joints were markedly thickened and tender to pressure. Patient walks with difficulty and pain; is hardly able to flex his knees, and is entirely unable to extend them. Passive movements elicit crepitation. Left shoulder-joint appears to be thicker than the right, and abduction is limited to 45 degrees. The muscles of several joints are markedly atrophied. VILLANEN (Roussky Vrach, April 25, 1903) excluded rheumatic affection in view of the chronic course of the disease, the nocturnal exacerbation of the pains, the absence of any marked alterations in the skin over the affected joints, as well as of any febrile condition during the whole length of the attack, and finally the complete failure attendant on energetic antirheumatic treatment. Tuberculosis of the joints was excluded by the multiplicity of the affected joints, by the fact that no purulent exudations were detected in any of the joints, the low temperature and the absence of tubercular signs anywhere in the system. As a matter of fact the employment of iodide of potassium in conjunction with mercurial ointments improved the condition rapidly and radically. After a series of inunctions the patient began to feel better, gained 23 pounds in weight and walked with comparative ease. The author is inclined to consider this polyarthrits as belonging to the late period of syphilitic manifestations. The patient very likely entered the hospital at the period of transition from the secondary to the tertiary stage; and it was because of this that the mercurial treatment in conjunction with iodine was more effective than the iodine alone, as employed in the beginning.

Sea Air for Pertussis.—Though there is still some diversity of opinion as to the specific cause of whooping-cough the malady is pretty generally conceded to be of an infectious nature, say DHOURDIN and LALESQUE (Jour. de Méd. de Bordeaux, July 10, 1903). Hence the indications for its treatment are deemed by them to be dieto-hygienic, aseptic, microcidal and serotherapeutic. The aseptis of the condition is represented by all the hygienic conditions advised in virulent and contagious diseases generally: Aeration, isolation, disinfection of the apartment and sterilization of objects and clothing belonging to the patient. As to microbicides, but few are of any real service in pertussis and those which have done such excellent service in surgical practice are not available in medical diseases. Inhalations of ozone have proven of real benefit in the hospital treatment of pertussis by L. Delherm, who attributed the favorable influence seen from this method of treatment, to the antispasmodic properties of ozone. The author, however, believes it to be antiseptic as well, and a true germicide in bronchopulmonary affections. To the fact that ozone abounds in sea air the authors attribute the benefit derived in this affection from a sojourn at the sea side and they urge the advantages of such a change of climate in the treatment of pertussis.

Acetozone in Amebic Dysentery.—The interest which has lately been extended to this disease in the United States lends value to the report made by R. L. KURTZ (Medicine, August, 1903) of a sporadic case, which the author believes to have been due to infection from cats, an epidemic of the disease occurring among the felines in the town in which the patient lived. The history of the case extends over a period of about two years, the symptoms at the beginning leading to the diagnosis of gastric ulcer, until at a later date the *Amaba coli* was discovered in the stools. The emaciation increased and the patient finally died from a complication of causes. The autopsy showed extensive

pleuritic adhesions and numerous small abscesses and also a large cavity filled with pus. There were no evidences of tuberculosis. All the abdominal organs were adherent in a compact mass and several ulcers were found in the colon. There was nothing in the early history of the disease to direct attention to the dysenteric character, and this coincides with the observations of others that there may be severe ulceration of the cecum due to amebæ without dysentery, the stools being normal. In this case it was also probable that there was an infection of the stomach some months before the beginning of the dysenteric attacks. All known forms of treatment were without results and only acetozone given internally and by irrigations (1-1,000), seemed to have any influence. On the eighteenth day after this treatment was begun, the mucus, blood and fetor disappeared from the stools, the temperature was lower and the abdominal tenderness diminished. The patient was, however, in extremis and it is probable that if the acetozone had been employed earlier, the results might have been different and the author also suggests that if the drug were injected intravenously it might reach amebic foci in other organs.

SURGERY.

New Operation for Congenital Ectopic Vesicæ.—The only operation which really gives good functional results in congenital ectopia of the bladder is that of Maydl, which consists in implanting the floor of the bladder into the gut. Since however a certain percentage of cases are always lost by subsequent ascending infection of the genito-urinary tract, J. BORELIUS (Centralbl. f. Chir., July 18, 1903) suggests in addition, an anastomosis at the root of the sigmoid flexure, between its two limbs, so as to divert the main current of feces away from the site of operation. There was occasion to try this method only once, with good result. The steps of the operation would be as follows: (1) Dissection of the bladder from its surroundings with the formation of a large, elliptical piece of the bladder floor, containing the ureters. (2) Opening of the abdominal cavity sufficiently to permit access to the sigmoid flexure. (3) Lateral anastomosis between its two limbs. (4) Longitudinal incision into the flexure with implantation of the excised bladder wall. (5) Abdominal sutures.

Biliary Colic Without Calculi.—It is often found during an operation on the gall-bladder, that the pathological findings are in many cases not nearly as severe as the clinical symptoms would have indicated. The report of two very interesting cases by H. KRUKENBERG (Berliner klin. Wochenschr., July 20, 1903) also shows that attacks of typical biliary colic may be caused by a displaced gall-bladder, without the presence of any other lesions. Operation was done in two female patients who suffered greatly from such attacks and in which no signs of stones or disease of the gall-bladder were found. The fundus of the latter was found markedly displaced and its body stretched out, but there were no adhesions, and the walls were not changed in any way. In each case the gall-bladder was sewed to the abdominal wall and drained after an interval. A complete cure with cessation of all symptoms resulted. The author designates the condition as a migrating gall-bladder and advises operation in every case,—the gall-bladder also being incised to eliminate the possibility of any calculi being present.

New Method of Appendectomy.—Various methods have been devised by which the stump of an appendix may be treated so that there will be little danger of subsequent sloughing or infection of the neighboring peritoneum. E. RIES (N. Y. Med. Journ., July 4, 1903) objects to the method of dilating the stump and inverting it because the instrument must be passed into the

cecum and withdrawn after the inversion along the serosa of the stump thus exposing the serosa to the possibility of infection. He recommends the separation of the mesentery and the amputation of the appendix about one-third of an inch from the base. The stump is then held by forceps and the escape of the contents prevented by simple traction in the cecum. A fine round straight needle with a thread at the very end of which is a thick knot, is introduced into the stump one-sixteenth of an inch from the cut surface from inside outwards. The needle is then passed back into the lumen of the appendix and on into the cecum and passed out through the cecum about one inch from the base of the appendix. Pulling on this thread inverts the appendix immediately in a most satisfactory way and its serous surfaces are in perfect apposition and are held there by mere traction upon the thread while a second needle, with a cat-gut thread, sutures, in three or four continuous stitches, the serosa of the funnel of the inverted appendix. The first thread is then cut close to the bowel and by gently rolling between the fingers is drawn back into the lumen of the bowel. The mesentery is then sutured over the base of the appendix. The danger from the perforation of the bowel wall has been found to be very slight, as the experience with the Connell suture proves. Should a stricture or obliteration of the lumen prevent such an inversion this obstacle may be overcome by simply stretching or perforation and still there would be no fear of infecting the serosa of the appendicular stump.

Treatment of Fractures.—The article of D. JORDAN (Münch. med. Woch., July 7, 1903) gives evidence that the author is an enthusiastic believer in the massage treatment of fractures, combined however with immobilization, even where dislocation is absent. The massage consisted in stroking the limb in its long axis from the periphery to the center with increasing pressure, without however manipulating the actual site of fracture. Thus, a Colles' fracture was massaged, then a wet dressing applied and the arm fixed in a simple paste-board or wire splint till the next day when the massage was repeated. This treatment was continued until complete union had set in. Fractures of the forearm and of the condyles and epicondyles of the humerus were manipulated in the same way with the arm flexed to a right angle and in supination during the intervals. In fractures of the olecranon it is well to fix the arm in extension after every sitting, for three weeks; after this the arm is immobilized more and more in flexion. The absence of pain during massage shows that it is properly performed. Of seventy-three cases of fracture of the upper extremity, sixty-seven regained complete use of their limbs; the others, owing to advanced age or systemic disease had slight limitations of movement. Even where there is a constant tendency to dislocation, massage is useful, since it stimulates callus formation. In fractures of the lower extremity, massage is of marked advantage only when the break involves a joint; it should here be used with ambulatory dressings.

THERAPEUTICS.

Treatment of Atrophic Rhinitis.—The employment of acetozone, the new organic peroxide formed from the anhydrides of benzoic and acetic acids, is highly recommended in the treatment of this condition by J. M. BROWN (Medicine, July, 1903), who used it successfully in three severe cases. After removing the crusts, the acetozone is applied and a nasal spray used daily, consisting of a solution of one-half of one per cent. of pure acetozone in a neutral organic oil.

General Anesthesia with Chloride of Ethyl.—The advantages of chloride of ethyl—kelene—are set forth

by J. VANVERTS (Nord Méd., July 1, 1903). In his experience it allows of easy and rapid anesthesia and is free from the discomforts and dangers of chloroform and ether. The graduated tubes containing from one to two ounces (25 to 50 c.c.) permit an exact knowledge of the amount used, which should not, as a rule, exceed one ounce (25 c.c.). The fluid may be used upon a mask or compress, $1\frac{1}{4}$ drams 5 c.c.) being given; $\frac{1}{2}$ to $\frac{3}{4}$ drams (2 to 3 c.c.) for children and $1\frac{1}{2}$ to $2\frac{1}{2}$ drams (6 to 10 c.c. for alcoholics) and this dose repeated at five-minute intervals during the operation, to the limit of 25 c.c. It will thus be seen that chlorethylization is best adapted to short operations, though it may be advantageously employed in longer operations as a preliminary to chloroform or ether. By this means the discomforts and dangers of chloroform and ether anesthesia are overcome and a smaller quantity of the latter drugs may be used. Analgesia is produced by one to two inhalations, provided these are sufficiently deep and air has not been inspired; and complete anesthesia generally ensues in three minutes. This is indicated by muscular relaxation and sometimes by dilation of the pupil and abolition of the corneal reflex. Anesthesia continues for three minutes after inhalation of $1\frac{1}{4}$ drams (5 c.c.) of kylene, when the dose must be repeated if it is desired to prolong anesthesia; but complete analgesia persists for from fifteen to twenty minutes after withdrawal of the drug, the patient regaining consciousness but suffering no pain during the completion of the operation, should it be deemed expedient to continue the work in this condition. Not the least of the advantages claimed for chlorethylization is the absence of initial excitement, in ordinary cases; though a slight excitement—not in the least comparable to that produced by other anesthetics—is seen in hysterical and alcoholic subjects and when air gains access to the patient. Both pulse and respiration are normal in kylene anesthesia. As a rule, nausea is absent when the patient awakens, and no ill effects are felt. An objection to kylene as a general anesthetic is the occasional failure to obtain the complete muscular relaxation essential to the performance of certain operations, such as reduction of dislocations; in which event the operator must hold himself in readiness to continue the work with another anesthetic. The rapidity with which the patient arouses, necessitates repeated doses during the operation; and as the amount given should not exceed 1 ounce (25 c.c.) kylene is ill adapted to long operations. As a preliminary to ether or chloroform it is, however, desirable in more lengthy surgical work.

Yohimbin as Anesthetic.—From the article of C. MAGNANI (Münch. med. Woch., July 14, 1903) it seems that yohimbin possesses unexpected anesthetic properties and that it is destined to play an important rôle in minor surgery. Five drops of a 1-per-cent. solution injected into the arm so as to form a wheal, rendered an incision down to the fascia absolutely painless. The anesthesia lasted fully $1\frac{3}{4}$ hours without the appearance of toxic symptoms or alterations in the muscular tonus. Reviewing all the drugs which have been recommended to anesthetize the eyes, it seems that disadvantages adhere to each of them, so that yohimbin may ultimately fill a long-felt want.

Antistreptococcus Serum in Erysipelas and Puerperal Sepsis.—The results of the employment of antistreptococcus serum published so far are so contradictory that no definite idea can be found as to its utility as a therapeutic agent. RAVITCH (Prakt. Vrach., No. 25, 1903) presents 2 cases of erysipelas and 2 cases of puerperal sepsis in which he used the serum. The

first was a typical case of facial erysipelas in a woman 50 years of age. The disease was in its fifth day of development, spreading rapidly and unyielding to various remedial agencies such as carbolic acid, ichthyol, etc., when 5 drams (20 c.c.) of antistreptococcus serum were injected; improvement followed on the next day, and in the course of a week the patient was rapidly convalescing. In the second case the favorable results of the injection manifested themselves on the third day. Of the puerperal cases the first became septic soon after delivery; when seen by the physician during the third week after confinement she presented typical signs of sepsis, pain in the uterus, daily sweating, offensive lochial discharge; abdomen somewhat distended and pronouncedly painful; 5 drams (20 c.c.) of the antistreptococcus serum was injected, followed on the next day by a double dose; improvement was gradual but undoubted, and in the course of a month the patient was discharged well. In the second case, that of an adherent placenta that necessitated extraction, sepsis was quite pronounced during two weeks, at the end of which an injection of the serum was made; but as improvement was not observed, and the supply of the serum was exhausted, routine treatment was resorted to, until a new supply of the serum was injected on the fifth day. Unfortunately the result of the treatment became obscured through an unexpected complication of pneumonia from grip. However, the patient eventually recovered with a somewhat diminished mobility of the uterus. Notwithstanding the small number of cases in which the serum was employed the results obtained are undoubtedly interesting and may lead to further trials.

Silver Nitrate Injections in Tuberculosis.—Good results are reported by H. T. BASS (International Med. Mag., July, 1903) from repeated injections of silver nitrate into the neck over the vagus nerve. Five drops of a $2\frac{1}{2}$ -per-cent. solution were generally employed. There seems to be nothing else which is so efficacious in modifying favorably such a large number of symptoms and even in advanced cases the cough and expectoration are always improved. In the incipient forms it has a most powerful influence for the good, bringing about the quite unexpected changes.

Veronal.—As excuse for discussing a new hypnotic, T. R. OFFER (Centralbl. f. d. ges. Therap., July, 1903) states that in chronic cases of insomnia one is often obliged to run through the entire list to avoid tolerance. Patients will also get accustomed to veronal in time, yet one can bring about a natural sleep with small doses for quite a period. It is best to begin with $7\frac{1}{2}$ grains (half a gram) and to increase the dose daily by $\frac{1}{4}$ grain (five centigrammes) up to 15 grains (one gram) or until depression the following day shows that all of the drug is not excreted.

The Pharmacological Action of Optical Isomers.—That protoplasm has the power of distinguishing between the various isomeric forms of sugar and tartaric acids, is well known, according to A. R. CUSHNY (Proc. of the Amer. Physiol. Soc., Amer. Jour. of Physiol., July 1, 1903). Fisher has shown that this power is also shared by the ferments. The mammalian tissues also oxidize one of the isomers more rapidly than the other. The author's experiments were performed with levo-hyoscyamine and the racemic form, atropine. It was found that these acted equally strongly on the terminations of the motor nerves in striated muscle in the frog, on the frog's heart muscle and on the central nervous system in mammals, while atropine had a more stimulant action on the central nervous system of the frog. Hyoscyamine acted almost exactly twice as strongly

as atropine on the nerve terminations in the salivary gland, heart, and pupil in mammals, from which it was inferred that the racemic atropine liberates the two optically active forms when dissolved, and that the dextro-hyoscyamine is practically devoid of action in these organs. This was confirmed by examination of some dextro-hyoscyamine. It was found that levo-hyoscyamine acts 12 to 16 times as strongly on the salivary secretion as dextro-hyoscyamine, and about 12 to 14 times as strongly on the terminations of the inhibitory cardiac fibers. The terminations of the nerves in the salivary glands, heart and pupil can therefore differentiate between these optical isomers.

A New Digitalis Preparation.—An attempt to obtain a uniformly active, sterile and non-irritating preparation of digitalis for subcutaneous and internal administration, has resulted in the production of "digitalone," which is claimed by its discoverer to obviate the difficulties attending the administration of the ordinary preparations of digitalis. In a recent article, E. M. HOUGHTON (Medicine, August, 1903) states the manner in which the drug is prepared and also gives the result of animal and clinical tests. He employed a large number of menstrua for percolating digitalis leaves, the irritating properties of each percolate being determined by injecting small quantities subcutaneously into guinea pigs and chloroforming them some hours later and examining the site of inoculation. Blood pressure tracings from the carotid artery of the dog were also made to determine whether the drug was capable of producing a typical digitalis action. Finally a non-alcoholic fluid preparation was obtained (the menstruum is not, however, stated) which produced characteristic slowing and increased systole of the heart, accompanied by marked increase in blood pressure. As it contained no alcohol or other preservative, chlorotone was added (about six-tenths of one per cent.), to prevent bacterial decomposition. The fluid has been adjusted to the strength of a 10-per-cent. tincture by determining the minimum lethal dose per gram body-weight for frogs and comparing the results with those obtained from the injection of known quantities of a standard preparation of digitalis under the same conditions. Animal and clinical experiments have shown that the drug is uniform, non-irritating when given subcutaneously, readily absorbed and produces the typical digitalis action when given per rectum, internally, hypodermically, or intravenously, is aseptic and remains so if stoppered. The dose is from 5 to 15 minims subcutaneously, 10 to 30 internally.

PHYSIOLOGY.

Contributions to the Physiology of Vision.—Together with other original discoveries connected with the physiology of sight, C. BAUMAN (Pflüger's Archiv, Vol. 95, Nos. 7-8) finds that various colored lights influence the power of accommodation to a varying degree. From a piece of red glass 15 mm. square a vertical strip 1 mm. broad was cut out in the middle; from another piece of glass of the same size and shape but colored blue, a horizontal medium strip of the same size as in the former case was removed. The two sets of colored glass were placed in the stereoscope. Upon looking through the latter the colored glasses naturally appeared superimposed, but the clefts, vertical in one case and horizontal in the other, did not appear of the same breadth. The vertical cleft in the red glass seemed broader than the horizontal cleft in the blue glass. The reason assigned for this phenomenon is that red light arouses the eye to a more powerful accommodation than blue or yellow light. This stronger accommodation is not different from that which the eye exerts in looking at a near object. This stronger accommodation of the

eye aroused by red would lead to the conception that in this way the attention of man and animals is stimulated to a considerable degree. If one is unexpectedly brought face to face with a broad red surface one feels distinctly the effort of the eyes trying to accommodate themselves to red, and at the same time is experienced a sensation of fluctuation of the image. This latter results from the apparent spatial change that one thinks takes place in the position of the red surface. The image of this surface is the same as that which would be aroused by that of any other color at a nearer distance, and one therefore has the impression as if the red surface is rapidly approaching; this approach is intensified by the apparent recession of the non-red portion of the picture. That animals are markedly disturbed by red objects has been known for a long time, and this irritation can be easily explained on the basis of the stronger accommodation for red. The bull in whose presence a red cloth is brandished experiences the same impression as man; he sees in the red cloth a rapidly approaching object which he interprets as an enemy, and he rushes forward to meet it. To attribute this stimulus to the fact that the beast imagines he sees blood, is to credit him with an intelligence he does not possess.

Is there Vasomotor Right-handedness or Left-handedness?—This question is answered in the affirmative by E. CAVANI (Archives Italiennes de Biologie, June 10, 1903). In an examination of a large number of right-handed and left-handed individuals, he finds a vasomotor reaction more intense and more rapid on one side of the body than on the other. Generally the conditions more favorable to the vasomotor reaction are found on the side of the body more able to put forth the greater muscular effort. The difference in time between the reactions on both sides of the body may amount to one second. Very probably, the vasomotor asymmetry is to be ascribed to the greater permeability or conductivity of the nervous routes in the extremities which have been more freely exercised, without excluding the possibility of the influence of the varying degrees of sensorial excitability in the two halves of the body or the corresponding halves of the brain.

The Fatigue of the Vasomotor Apparatus.—The centripetal portion of the vasoconstrictor mechanism and more markedly the centrifugal portion, present a remarkable resistance to fatigue, according to R. SCHINCKEL (Annales de la Soc. de Méd. de Gaud, 1903, No. 3). The author was not able to produce fatigue in the centripetal vasoconstrictor filaments of the sciatic nerve until after at least one hour of tetanization. As to the vasoconstrictor nerves of the spinal cord and of the splanchnic nerve, a prolonged uninterrupted tetanization lasting two hours was not able to produce complete fatigue in the peripheral vasoconstrictor apparatus. During the excitation of the centripetal nerves, the vascular tone is slightly diminished. Fatigue of the vasoconstrictor apparatus is characterized by the appearance of marked undulations of the vascular tonus.

Physiological Cholemia of the Mother and New-born.—The comparative study of the blood of the mother, new-born and umbilical cord, by A. GILBERT, P. LEREBoullet, and Mlle. STEIN (Annales de Gynéc. et d'Obstet., July, 1903), shows that the blood of the cord contains three times as much biliary pigments as the maternal blood, and the blood of the new-born contains one third as much more biliary pigments than that of the cord. There is therefore a physiological cholemia of the new-born, of marked intensity, although remarkably well borne, and it is this which gives rise to the secondary cholemia of the mother.

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SATURDAY, AUGUST 15, 1903.

A TOOTH FOR A TOOTH.

JOHN BULL has most certainly established a reputation for conservatism and business acumen, if there is any faith in tradition, or virtue in heredity. But the latest action of the British war office in supplying false teeth gratis to soldiers, who have lost their own "as a result of active service," can hardly be classed as an exponent of their maxim of looking out for the pennies and letting the shillings take care of themselves. To be sure the amount involved, per head, is not large and the local dentists employed by the paternal government, can hardly regard Tommy Atkins in the light of a very remunerative gift horse, for the contract calls for the extraction of any and all teeth remaining, and the giving of an anesthetic, for which £1 is allowed. The "full sets" with the subsequent treatment of the gums and mouth are to be furnished at prices ranging from £2 10s. to £4 10s., so that the official dentists are much more apt to walk, than to ride in chaises, even if the appointments themselves do not go a-begging.

The weak notes in the harmony of this system seem to lie in the want of any middle register whatever, and are due to the fact that there appear to be no shillings of prevention to render unnecessary many pounds of subsequent cure.

The English recruits have to possess a sufficient number of good teeth on joining the army, and the obvious thing to do would be to make sure that they were not allowed to decay. This could be easily accomplished by the appointment of contract dentists at the various military centers, who should examine the teeth of the enlisted men at least twice a year, and see that they were kept in good repair. This, however, is not the war office plan, which seems to be that the rank and file shall wait until they are incapacitated for the want of sound teeth, and then be sent to the dentist for a new set. An exchange of the old lamp of natural teeth, for the new one of artificial brilliancy.

That this might improve the facial aspect of the "Household Guards" is unquestionably true, but if the beneficent government would go a step farther, and give an eye for an eye—as well as a tooth for a tooth—the "Guards" would doubtless present a strenuous appearance, that would carry consternation to an opposing enemy and render the dark recesses of Spion Kop as gleaming and electric as San Juan Hill itself.

What they would gain in appearance, however, they would undoubtedly lose in efficiency, as it is unnecessary to say that the strength and health of men in campaigns depends more on their food, their ability to eat it in comfort and to masticate it thoroughly than on any other factor, and a regiment of men with sound digestions and a good commissariat, is better for practical purposes, than an army with banners. The roast beef of Old England is proverbial for its succulent tenderness, and her plum pudding has hardly to be bitten off or chewed. But neither of these national delicacies is served at the table d' hôte of action, and the stalled ox, on the field of battle, is as rare as the contentment, which is popularly supposed to accompany the dinner of herbs.

According to the official army report nearly all the teeth that were lost or ruined in the South African war were damaged by the biscuits. The soldiers averred that they were almost as hard as granite, and that it was impossible to eat them, unless they were soaked overnight, or died, like the classic victim of the Mikado, a humorous death by being boiled in oil. Instances, says this report, are numerous of "men whose teeth were broken to pieces, and who came home with a mouth full of jagged edges."

No one could expect troops that had been exposed to danger and privation, and who had been fed on such fare, to have any stomach left for

either fighting or digestion. It is true that in the earlier days the invading forces subsisted on the surrounding country, and the army in Flanders certainly did not suffer even if it did not grow strong on the fruits of its pillage. But all this was before the magazine rifle had been invented, and in the period that antedates the reduction of "snipping" to one of the fine arts. At the present time the unlucky and starving British straggler would find his prescription for the cure of hunger filled by some substituting Boer, if not with food, at least with what would be more permanent and "just as good."

It cannot, of course, be claimed that the result of any war could have been changed by a previous course of operative dentistry, but it would certainly seem wiser, to the professional mind at least, for England to appropriate money for the preservation of the natural teeth of her soldiers rather than to expend it in the gratuitous distribution of artificial ones. Teeth are not Indians, and the best ones are they that are still alive.

In the event of a night attack, moreover, it would complicate matters extremely to have an entire command turn their trembling hands to the convenient tumblers of water before they even grasped their arms, and should the "two pun' ten" sets be trampled in the ground, it could hardly be expected that they—like the teeth of the dragon of Cadmus—should rise again in serried columns to repel the invading foe.

So, by all means, let the Army dentist attend to his duties in the earlier stages of his military patient's career. Let him back and fill, scrape and bridge, remembering only that uneasy lies the tooth that wears a crown, and that nature is superior to art, in all things, particularly when it is in the mouth of the British Grenadier.

GALL-STONES IN THE YOUNG AND ACTIVE.

SINCE we are still much encumbered with the surgery of our grandmothers all experiments which tend to rid us of the fantastic reasoning and conclusions of their day are most heartily welcome. A roaring moral and intellectual bonfire once in a while not only consumes some of this old timber but lights the way for the finding of new fuel. Nevertheless, while we may be loud in our disapproval of the methods of the Chinaman we are at heart good followers of old Confucius. Who, for example, is there among us whose invective would not speedily be hurled against an iconoclast who should boldly assert

that gall-stones were rendered impossible simply by practising the art of the Epicureans or the Romans *after* the fortieth milepost were past!

Copper-fastened, bent in, and clinched in the mind of most practitioners is the time-honored notion that biliary concretions rarely occur in the young and are almost of necessity the misbegotten scions of Bacchus and his genial kindred sprites.

Indeed it is no exaggeration to say that, in the light of our present widespread and generally accepted beliefs, under almost no circumstances would one be justified in advancing exploratory incision, even in supposed cholelithiasis in a youngster of say twenty years!

The decidedly revolutionary conclusion that young, active women from the laboring classes are the most frequent victims of gall-stones is advanced by Dr. Otto Hartmann. His experiments and reasonings are published in a leading article in the *Deutsche Zeitschrift für Chirurgie*, April, 1903.

As early as 1891, Naunyn, at the Tenth Congress for Internal Medicine, held at Wiesbaden, expressed himself as certain that gall-stones were of bacterial origin. It is now universally acknowledged that micro-organisms play a very important etiological part—any negation of this theory having been rendered untenable by the findings of Miyake and Mignot. These antipodeans, working independently of each other, produced artificial gall-stones in the bile tracts of guinea pigs and rabbits, one-half to one year after the introduction of colon bacilli into these passages. Hartmann, working from the opposite standpoint, has been able to demonstrate the presence of germs in over seventy-five per cent. of his recent series of forty-six cases. The work of Herter and others along these lines now shows very conclusively that the concretions in many instances are of bacterial origin.

Having decided this, it becomes of paramount interest to know how the germ obtains ingress. There are three more or less generally discussed paths of transit. The first and most freely admitted is the direct course through the lumen of the papilla of Vater from the germ-laden wall of the duodenum to the absolutely sterile regions of the upper biliary passages. Albeit, this is a short path and one remarkably straight, it is well known that there are numerous valves in the mucous membrane of the ducts which, combined with the normal bactericidal power of the bile, have been considered *the* factors in preventing infection.

A second, and much less probable mode of infection of the passages is through the medium of bands of adhesions through the dilated vessels of which the germs are supposed to flow.

The third, or so-called hepatogenous path of infection is from above downward. It presupposes a general infection of germs and their free distribution in the liver via the blood. That this condition obtains in typhoid is well known and it is after this disease that the concretions are very prone to form. Although the liver is very freely supplied with blood it cannot be looked upon as an organ gravely interested as are the kidneys in freeing the body of the germs—it is no germ-filter. Nevertheless, the very anatomical arrangement of the blood supply favors hepatogenous infection.

It is fair to suppose that any one or all of these three factors may be in operation in a given case. What, then, are the barriers, other than those already cited, which Nature throws up?

It is well known that the activity of a gland varies directly in proportion to its blood supply. In blood, the liver is richer than any other organ save the lungs. In pregnancy and in chlorosis this is distinctly lessened. In like manner, as shown by Ranke, in violent muscular exertions such as are produced by tetanus, the blood flow to the liver is so lessened that its bile output practically ceases.

It is an easy and a natural step from these facts to the assumption that in the laborer so much blood is used by the muscles that not a sufficiency remains for the liver. Indeed, it may well be possible, according to Hartmann, that, particularly in patients whose biliary system is congenitally abnormal, there may not alone be an absence of flow of bile but actually a *negative* pressure. This not alone tends to aspirate the colon or other bacilli from the duodenum—despite the *Valvula Heisteri*, but to create by the anemia a *locus minoris resistentiæ* where germs might grow apace. So, often between the twentieth and thirtieth years the corner-stone, so to speak, is laid—but the growth is slow.

Symptoms may not develop for ten or fifteen years, but the *disease* is there. These conclusions of Hartmann are of great interest and his tables will reward the most patient study.

A NEW BLOOD PARASITE.

In addition to the routine activities of a health department, the Montana State Board of Health has undertaken and apparently carried out to a

successful issue a very commendable piece of work in the investigation of a peculiar disease known to them locally as spotted fever.

In the Bitter Root Valley there has existed for some time a disease which has been responsible for many deaths and which has created more or less alarm in the minds of the residents of that valley, the cause of which has been attributed to various factors, particularly the water, the mineral and the general conditions of the soil, and by many thought to be due to the snow of the Bitter Root Mountains. This disease, known in Montana as "spotted fever," "black fever," or "blue disease," has been recognized as a clinical entity by the physicians of the region for fifteen to twenty years, the first case having occurred as far back as 1873, from which time to the present over 200 cases of the severe type have occurred, 70 to 80 per cent. of which have proved to be fatal. During the spring of 1902, 18 cases of the disease were observed, 15 of which died.

The disease seems to be confined to the eastern foothills of the Bitter Root Mountains, arranged along the top of which runs the Montana-Idaho State line, and few if any cases have been known to originate in Montana outside of this territory.

The investigation was taken up by Doctors Louis B. Wilson and Wm. Chowning, both connected with the University of Minnesota, and State Board of Health. They entered upon their investigations May 16, 1902, and after a most thorough search found in the red blood cells of the patients suffering from the disease, a new parasite closely resembling the *Pyrosoma bigeminum*, the cause of Texas fever, yet differing from that organism in being larger, and in its larger forms exhibiting active ameboid movements. The absence of pigment from the organism of spotted fever separates it, the authors think, from that of the malarial group and places it in close alliance with the parasites found to be the etiological factors in Texas fever. The investigators, however, prefer to make a more extended investigation of the parasite before determining its exact zoological relationships.

An extremely interesting feature of the observations is shown in a possible relationship of the tick which is found on the gray gopher, *Spermophilus columbianus*, as the chief agent in the spreading of this disease. It is well recognized that this class of insect is responsible for the spreading of Texas fever in cattle and man and the occurrence of an analogous species of tick in the gopher widens still further our outlook on the

relationship of animal parasites to the spread of disease. Furthermore, the authors show that the parasite is found in the red blood cells of the gopher and it is probable that this animal serves as the host of the new hematozoan.

While there are many points to be cleared up before final conclusions can be drawn on all of the side issues relating to "spotted fever," the authors are to be commended for their extremely painstaking piece of work, the credit of which should be ascribed in large part to the enlightened policy of the newly created Montana State Board of Health.

ECHOES AND NEWS.

NEW YORK.

Dr. Alfred Meyer.—The President of the American Congress on Tuberculosis, to be held in Washington, D. C., April 4, 5 and 6, 1905, announces Dr. Alfred Meyer, of New York City, consulting physician to the Bedford Sanitarium for Consumptives, chairman of a committee in charge of the section on sanitarium treatment of tuberculosis. It is probable that the climatic and other methods of treatment will be comprised under the work of this committee.

Work of Lying-in Hospital.—In the month of July the new Lying-in Hospital, at the corner of Seventeenth street and Second avenue, has had 572 applicants for treatment, of whom 135 were admitted and cared for in the hospital wards. The number of children born in the hospital during July was 110. For the same period in the outdoor department, 303 applicants have applied for assistance in their own homes, and 208 patients have been treated in confinement. The number of medical visits made was 880.

New Bellevue Hospital Now a Probability.—President of the Board of Trustees of Bellevue Hospital J. W. Brannan on last Monday announced that certain difficulties which had been encountered in connection with the acquisition of the block between Twenty-eighth and Twenty-ninth streets, running down to the East River, had been disposed of, and that the way was now clear for the Department of Charities to acquire the land. The difficulties centered particularly about the dock which the city owns at the foot of Twenty-eighth street, and the dumping ground for the Street Cleaning Department at Twenty-ninth street. It was desirable that these places should continue to be maintained, yet their continued presence meant that the elaborate plans for the new hospital could not be carried out in their entirety. Repeated consultations were had between the Superintendent and Dock Commissioner Hawkes and Street Cleaning Commissioner Woodbury in an effort to find a way out of the difficulty. At last, after close scrutiny of the official maps of the city, it was found that the city and dock rights at the foot of Twenty-ninth street and the dumping ground for the Street Cleaning Department could be moved up a block, to Thirtieth street. With this discovery the solution of the difficulty has been found. A short while ago the Board of Aldermen authorized condemnation proceedings begun to acquire the block in Twenty-eighth and Twenty-ninth streets. The principal building at present on it is the power house of the United Electric Light and Power Company. The company offered to sell to

the city their rights in the property for \$1,460,000. This was considered too high a price, and the condemnation proceedings were then authorized. The acquisition of this property will remove a nuisance which has long been a source of annoyance to the hospital authorities—the tall smokestack attached to the power house, which frequently emitted big clouds of black smoke, permeating the hospital buildings. President Brannan said last Monday that in all probability work would be begun on the new buildings for the hospital about October. It is planned to start building at the northern end of the site, the Twenty-ninth street end. As soon as one building is ready for occupancy, one of the old ones will be torn down, and so on until all the old buildings have been removed. Mr. Brannan said that the cost of land to be acquired and the sums to be spent to put it into condition for building will amount to about \$2,000,000. The site will comprise the lots from Twenty-sixth to Twenty-ninth street and from First avenue clear to the river.

Hudson Water Favored.—It was stated at the Water Department last Monday that the preliminary report of the special commission on additional water supply, which was appointed by the Mayor early in the year, will be made public about September 1. Commissioner Monroe said some time ago that the report would be ready about July 1, and the delay is explained on the ground that the Commissioners were asked by Mayor Low to make an investigation of the Jerome Park reservoir, and were obliged to let the water investigation rest for a while. It was stated, also that the report which is expected in September will contain more detail than it was originally proposed to incorporate in the preliminary report. Just what the commission will recommend is not definitely known, but from the best information obtainable it is said that its members have agreed that the Hudson River above Poughkeepsie is the most promising and permanent source of supply for the entire city. The commission has examined all possible sources, but it is understood that the main objection to most of them is that while they might meet the present demands, the growth of the city would, in a few years, render it necessary to again seek additional sources. The main objection to the Hudson River source is said to be expense. To distribute water in Brooklyn, large mains would have to be constructed under the East River, and, it is claimed by many engineers, the water would be so brackish that it would have to be put through an elaborate process of purification before it could be safely consumed.

A Plea for the Dogs.—Apropos of our discussion on Hydrophobia, in the Original Articles in the News this week the following letter to the New York Times is deemed pertinent. We reproduce the article in full:

To the Editor of The New York Times:

DOG ORDINANCE SIGNED.

Mayor Low yesterday signed the dog-muzzling ordinance.

Tut-tut! Likewise avant!

As a loyal Columbia man, I had almost taken it for granted that, although the Board of Aldermen would of course put their feet in it, our worthy ex-President could be depended upon to spare me, in the "dog-days," by a wise veto, the bother of buckling on my armor and shivering a lance for the reputation of this town for mercy and justice toward our brute friends.

A time or two in the past I have published in your

columns over the pseudonym of "Quaestor" views upon matters and things which have been so happy as to meet with your subsequent editorial approval. Let me humbly hope for a like fate to-day; after which I will resume my palmleaf fan and be able to look my dog in the eye without fancying therein a look of mute contempt and reproach.

The present agitation, worked up by one of our newspapers during the "silly season," in absence of a better occupation, and helped by misjudged action by the County Medical Association, and resulting in an official scare about dogs, reminds me of nothing so keenly as the spectacle of a lady with skirts closely wrapped about her person standing upon a chair in deadly fear of a mouse upon the floor. That lady is New York to-day.

Of course, rabies does occur occasionally, but chiefly in winter time most rarely when the weather is hottest. The statistics of the Pasteur Laboratory of Paris, quoted by Dr. Ruffer of that laboratory in a report to the British Medical Association (see N. Y. Med. Record, Sept. 28, 1889, p. 357 et seq.), show that the lowest number of cases of mad dog bite occurs in August, the highest number in February.

It cannot be too strongly affirmed that in hot weather, for one genuine case of rabies there are many of supposed rabies, which are due to nothing save the wearing of a muzzle during the heat. Because of this torture (unless the muzzling is a mere farce and utterly useless to prevent biting) the mouth is at least partially closed. In summer this often compels sunstroke, in consequence of which the dog is apt to act queerly—or even to have a fit; whereupon the poor beast is chased and finally shot. The incident is closed by a record in the newspapers of one more case of hydrophobia "in our midst."

Dogs vary in temperament as do human beings. Those of a nervous and excitable nature may temporarily go crazy, as a man of like temperament might become delirious from heatstroke.

May I, with apologies, right here deliver a two-minute lecture upon dog physiology? It is guaranteed to do nobody any harm.

Dogs have no sweat glands. Upon the most sultry day their skin will be found dry. But they must of course lose water to keep cool. This they do from the tongue, which drips steadily, but possibly even more is lost by means of panting. The inhaled air is comparatively cool and dry. The exhaled air is hot and saturated with moisture. By these means alone can they accomplish what we do by aid of our sweat glands chiefly. Among human beings it is always the person not perspiring who, if anybody, is in jeopardy of heat stroke. The mechanism whereby a dog in need of cooling his blood makes some 200 or more times per minute the respiratory motion called panting, demands for its performance as nature intended, a wide-opened mouth. With a mouth in which the oscillatory motion of the tongue is restrained even in the least by muzzling, the resultant fatigue, within a short time, is pitiful to witness. It is pure cruelty. Most wickedness begins in ignorance, and this is no exception.

If we must have muzzling, it should be, as a matter of logic, in midwinter since, as I have shown, rabies is commonest then. However, restraint at the end of a strap or chain would seem the proper solution of the problem. I, too, approve of restraint—to this degree, and throughout the year. Also, I am regretfully compelled to agree with the strongly expressed opinion of the late Col. Waring, speaking in his capacity as guardian of the city's cleanliness, namely, "town is no place for a dog."

It is a matter of more than usual interest just now to inquire whether the common expression "the dog days," meaning the heated term, may not in part have helped to fix in the popular mind the mistake regarding the danger from hydrophobia being greatest during that period. Of course, the reasonably well-read know that "the dog days" have no such meaning nor peril. They are forty days, figured twenty before and twenty after the first morning that Sirius, the Dog star, becomes visible before sunrise.

They also have been called "Canicular Days," but Shakespeare uses the expression "Dog Days" for them. When first named and observed, the reckoning was from July 3 to Aug. 11, but the procession of the equinoxes changes this forward a day in each seventy years, and the dog days now run from July 25 to Sept. 3.

The writer of this letter devoutly wishes that the public could be induced to stun by blows, and not kill with bullets, dogs that apparently have gone mad. Afflicted with genuine rabies, the poor animal is certain to die, and quickly. If instead it is heatstroke, abundance of cold water and possibly blood letting may save its life.

If it recovers, think of the relief from mental anguish of those who may have been bitten by the crazed animal, and who now know that they are in no jeopardy of madness; have no need to undergo the Pasteur treatment. Because of the present foolish plan of killing at sight every dog in a fit in summer time, an unspeakable amount of anxiety and dread, most of it wholly needless, is caused among those bitten.

Indeed, there is actually a disease called Lyssophobia (Lyssa is one of the names for rabies), which at times, among the highly strung and hysterical, is capable of killing. It is death from pure fright, with symptoms imagined by the victim to be those he ought to have—such as barking like a dog, etc.

To return to our incubus, the present statute. What are we to do with it? Enforce it? Never! I have too much confidence in the common sense of the citizens of this city, even those in high places, to believe it of them. I appeal from Philip drunk to Philip sober of thought. In an address before us of the Nineteenth Century Club last winter Recorder Goff, in speaking of a wholly different matter, said that there is certainly no lack of laws upon our statute books, as affecting the City of New York. On the contrary, quoth he, there are enough laws existent and unenforced to start a respectable law library!

In view of the facts in this case, as presented herein, am I wrong in feeling that the best way out of a rather shameful situation will be to add just one more—namely, this newest ordinance, to the long list alluded to by our distinguished Recorder? Let it be honored in the breach.

Of course it is admitted that under ordinary circumstances the best way to treat an objectionable law is to enforce it rigidly. Those suffering injustice will be loud in their protests, and a sense of justice will lead to its repeal. But in the present instance the victims cannot ask for fair play.

If it were not asking too much of poor human nature—for it needs the rare quality called moral courage to admit a blunder—I would suggest that the Aldermen should at once repeal this ordinance, substituting therefor one commanding a leading cord, strap, or chain, and omitting all reference to that instrument of torture, the muzzle.

QUAESTOR.

The Insane at Bellevue Pavilion.—The Evening Post very sanely says: "Whatever the insane pavilion at Bellevue may have been in days not so long gone, when many grim and ghastly tales of abuse of patients were made public, there is no evidence on these fair mornings to warrant a belief that it is anything but an efficiently conducted hospital ward. Since the new board of trustees of Bellevue and Allied Hospitals went into office, they have effected many reforms; none of them, perhaps, shows more distinctly when contrasted with former conditions than the present methods of caring for the insane while awaiting discharge or commitment to an institution. Unfortunately, the penny papers have fostered popular superstition about the insane pavilion among the very people who largely fill its beds. They regard it as a place of horrors, and delay putting their friends and kinspeople under treatment, usually, until the police interfere. A visit quickly belies the ignorant and commonly held misconception of the place. The two long wards are specklessly clean and bright, the sunlight coming through the iron-grilled windows, giving the long rooms a particularly cheery appearance. The ward for females upstairs is even brighter, being lighted by skylights as well as windows. Several cages filled with singing canary birds, the big rocking chairs, and the tables, gave the ward the air of a big living room. The sleeping rooms are on either side of the broad hallway extending the length of the building. Despite their cheerful surroundings and the presence of the rosy-cheeked, white-capped nurses going briskly about the morning's routine, the women patients sat gloomily apart from one another.

In the Male Ward at Bellevue Pavilion.—In the men's ward there was a more social air. All of the patients, wearing pink pajamas, were in groups chatting softly. One man was earnestly reading the classified advertisements in a newspaper held upside down. He was arrested for writing threatening letters to consuls and port officials reciting alleged grievances. He came by his delusions honestly enough in the "fire hole" of a South American steamer. He was a stoker, and the work, combined with the effects of a spell of fever in Santos, added the none too deep contents of his brain pan. Except for the woman who cried, all of the patients might have been convalescents from any ordinary illness. The insane pavilion rarely ever comes to public notice, save through the medium of some tragedy or scandal of mismanagement, and account is not taken of the many weeks when nothing untoward happens. Previous to the present administration the patients were in the care of physicians with little experience in the treatment of the insane. During their absence the members of the regular house staff of the hospital performed these duties in addition to their own. This arrangement was so obviously unwise that the new trustees named Dr. F. Packer resident physician and gave him two assistants, Dr. M. S. Gregory and Dr. D. C. MacClymont. All of them had had previous experience in asylum work. A system of hospital treatment has been adopted, so that all cases are given the benefit of the same service as in a general hospital for the care and treatment of the insane. The use of mechanical restraint has been abolished except in cases where it is absolutely essential to prevent injury to the patients or their nurses, and it is only applied on the order of the medical officers. The use of the belt, cuffs and waist straps has been discontinued. Where necessary, a restraining bed sheet and bandages are applied under the direction of the medical officers only. The use

of sedatives as a restraint has been reduced to a minimum, and they are only given on the prescription of a medical officer. An increased number of patients have been furnished with employment about the wards and in the performance of other duties to the end of relieving the monotony of their detention. An improved system of case records has been adopted. A report of the physical and mental condition of each patient is recorded. These reports are supplemented by the daily notes of the nurses under the direction of the medical officers, and contain a complete record of all medicines prescribed.

Changes in Nursing Service.—In the male ward, the nursing service has also been materially changed. In place of pupil nurses, the patients are now in charge of trained asylum attendants who have been drawn to a large extent from the State hospitals. A carefully chosen woman head nurse has been placed in the ward with most happy effect upon the patients and the atmosphere of the ward. The number of attendants has also been increased, being now in the proportion of one attendant to three, or, at the most, four patients. The number of nurses in the female ward has also been increased. The work of the resident physicians has been greatly helped since the positions of examiners in lunacy were abolished. The employment of skilled alienists made this possible. The fact that the examiners in lunacy had their own private practice and were required to attend at the pavilion for but two hours in the afternoon of each week day, necessitated many delays in the examination of such cases as for any reason were not ready for treatment in those hours. About 2,500 men and women are brought to Bellevue yearly under the belief that they are insane, and the physicians are under the gravest responsibility lest some person who is not really deranged permanently be committed. Only recently a woman who tried to have her husband committed and who told a logical, circumstantial story of his alleged symptoms, was found on examination to be as mad as a hatter. Her husband was detained three days before it was determined that he was sane, and that it was his wife who needed restraint. Another woman who had her husband locked up because of his alleged insanity came to the hospital the following day and threatened to clear out the place unless "her man" was released. She had charged him with insanity in a fit of anger after a quarrel.

PHILADELPHIA.

Physicians Fined for Failing to Report Smallpox Cases.—Two physicians have each been fined \$5 and costs by Magistrate Cunningham for failing to report cases of smallpox to the Bureau of Health. One of the cases had been diagnosed as chickenpox.

Quarantine Upheld by Court.—Judge Davis, in Quarter Sessions Court, recently dismissed the writ of habeas corpus brought to gain the liberty of Norman R. Hyland and his family, who were declared to be starving to death after a week's smallpox quarantine at their home. The action of the Bureau of Health in denying Hyland, his wife and three children the means to obtain food was said to be due to the man's persistent refusal to have one of his children, suffering from smallpox, removed to the Municipal Hospital. The Bureau of Health justified its action by the fact that the city has a hospital for all such cases. The attorney for Hyland demanded that the man be allowed to work or that the city provide food for the family. After hearing the testimony of both sides, Judge Davis said the case narrowed down to the question as to whether the

Board of Health had a right to quarantine the house. This right was given, the Judge said, in an act of 1818. He declared that if the condition of the family was as stated it was unfortunate. "But," he continued, "if provision is to be made for families under quarantine in their homes, there would be danger of many families being under quarantine for 365 days of the year."

Pasteurizing Plant in Operation.—The pasteurizing plant donated by Nathan Straus, of New York, was put in operation August 5. Dr. A. R. Green from the plant in New York said that Philadelphians should be proud of their laboratory as it has larger quarters and is more completely equipped than any other in this country. Branch distributing stations are to be established in different sections of the city. Contributions to the amount of over \$2,000 have already been made for the support of the enterprise. The milk will be given free on an order from a physician or recognized charity, but if the persons applying for it are in a position to pay they will be charged a nominal sum. For a six-ounce bottle or under the price will be one cent, for an eight-ounce bottle, two cents, for a sixteen-ounce bottle, three cents.

Dr. Royer to Head Municipal Hospital.—Dr. B. Franklin Royer has been selected by Director Martin to be head of the Municipal Hospital. Although a young man, Dr. Royer has had considerable hospital experience, having been chief resident physician at the Jefferson Hospital for the past seventeen months. He is about thirty-seven years old, and a native of this State. He was educated at the Mercersburg Academy, and entered Jefferson Medical College in 1895. He was graduated in 1899, receiving a gold medal and highest honors in obstetrics. He was immediately appointed a resident physician in the college, the first man to be appointed that year, and he served fourteen months before becoming chief resident physician. As chief resident physician, Dr. Royer will reside in the Municipal Hospital, and will give its affairs his undivided attention. Dr. William M. Welch will, it is understood, be retained by the Board of Health in a responsible position, where his expert knowledge of contagious diseases will be utilized. It is thought that he can do especially valuable work in connection with the work of the health inspectors.

The White Haven Sanatorium.—In a recent article read at the Luzerne County Medical Society, Elwell Stockdale, Superintendent of the White Haven Sanatorium of the Free Hospital for Poor Consumptives, gave some very interesting points regarding the work of that institution. During the first winter their 18 patients slept in a dilapidated barn, the thermometer often below zero and no heat whatever in the building. In spite of these conditions the patients contracted no colds, pleurisy or pneumonia and never since have the results quite equaled those obtained during that period. This is a strong argument in favor of the tent theory for all winter, yet Stockdale would hardly advise anyone to try it. At present the Sanatorium has 100 beds with a large waiting list. All patients whose temperature permits are kept out of doors eight hours daily. On forced feeding every patient is compelled to take not less than four quarts of milk and six fresh raw eggs daily, and many take six quarts of milk and 12 eggs daily, a few even more. They believe that no patient who cannot take forced feeding has much chance of recovery. Breakfast is a light meal served at seven o'clock. At nine o'clock a lunch of milk and eggs is served, and at

twelve o'clock dinner, which is the only heavy meal of the day. At four o'clock is given a lunch of milk and eggs and soda crackers, and at seven o'clock supper. The minimum, but not the maximum, quantity is limited. No patient with a temperature above 99½° F. is allowed to move about, and above 100° F. they go to bed. All patients rest in bed not less than ten hours. Some of the gains in weight are remarkable, one man gaining 23½ pounds in twenty-five days. The results are equaled nowhere else, either in this country or abroad. Stockdale says the secret of their success is their method of feeding, the careful individual attention given each patient, and the rigid rules to which all must adhere or leave. Spitting on the ground is made a cause for expulsion. The medication used is euophum in all cases, and varying tonics to aid digestion in most cases. Expectorants when the patient has a cold and creosote in all cases with mixed infection. Whisky is never given. For hemorrhages nitroglycerin is used, and as a precaution against them it is also given when there is an accentuation of the pulmonary second sound of the heart.

CHICAGO.

Mortality Statistics.—Notwithstanding, or because of, the unusual character of the weather during the month just ended, the July death rate, 14.92 per thousand per annum, is more than 16 per cent. lower than the average of the ten previous Julys, which was 17.84. Three other years of the period, however, show lower July rates, namely, 1889, with a rate of 14.45; 1900, with a rate of 14.34, and last year, when the rate was 14.74.

Better Treatment of Diphtheria by Antitoxin Among the Poor.—Looking to the better safeguarding of the fund for the antitoxin treatment of diphtheria among those unable to pay for the remedy, arrangements have been perfected during the week whereby the Bureau of Charities will investigate all cases in which the Department furnishes antitoxin free on the claim of poverty. This will cause no delay in administration; the case will be treated first and investigated afterward.

Typhoid in Chicago.—There is no doubt that the inhabitants of Chicago attain a certain immunity in using the untreated lake water, and people who have been spending the summer away are more susceptible when they return to the city than if they had remained here. Nearly one-fifth of the typhoid cases are contracted away from the city. Many small towns and cities that are summer resorts along the shore of Lake Michigan and other neighboring lakes have imitated Chicago in their water supply and sewage disposal, except that, instead of the sewer and water intake being miles apart they are only a few hundred feet. There is some risk in omitting boiled water even when on a vacation.

Milk Supply in Chicago.—Publicity promotes purity of the milk supply. The publication of the names of delinquent dealers causes increased effort to obtain good milk. The Milk Bureau holds the dealer responsible; it cannot go back of him to the farmer. One result is that 769 samples of milk and cream were tested in the laboratory during the week—one-third of them being brought in by the dealers themselves. Only 2.8 per cent. of these were found below grade, and only 4.8 per cent. below grade from all sources. The improvement is remarkable.

GENERAL.

Transmission of Syphilis as a Penal Offence.—A man has been sentenced to five months' imprisonment in Munich for having knowingly infected a

woman with syphilis. The judgment was based on the ground that a serious injury had been inflicted on the complainant.

Cancer in Hungary.—The number of deaths from cancer in Hungary is about 8,000 annually. The Budapest Society of Medicine has appointed a committee to make an inquiry into the distribution and prevalence of the disease in the country. The committee, of which Dr. J. Döllinger is chairman, has issued a schedule of questions on the subject to all medical practitioners in Hungary.

Rabies in Cats.—Owing to the prevalence of rabies among the cats of Amberg, Bavaria, the authorities gave orders for a massacre, and not a single cat has survived.

Mortality and Birth-rate of the World.—According to a recent calculation, there are 68 deaths per second; 97,920 daily, or 35,740,800 yearly. Births occur at the rate of 70 per second; 100,800 daily, or 56,792,000 yearly.

First French Antituberculosis Congress.—This congress will meet in the grand amphitheater of the Faculty of Medicine in Paris, October 26 to 29, 1903.

Smallpox in Jersey.—There is a good deal of excitement in Hightstown, a small town near Trenton, because of the existence of smallpox within its limits and the lack of a head to its board of health. Dr. William L. Wilbur, a physician of the town, has been medical director of the board for a long time, but he has come to the conclusion that his private practice will not permit him to give his attention to public health matters and has resigned. Dr. Elmer J. Rogers was appointed to succeed Dr. Wilbur, but he has respectfully declined the honor, and Inspector August T. Skillman has handed in his resignation. Meanwhile, the smallpox has been gaining headway.

Preacher a Health Officer.—In an effort to secure a thoroughly clean town for Pottsville, Pa., the Board of Health last Monday elected the Rev. W. D. Williams, pastor of the Congregational Church, as the town's Health Officer. Mr. Williams will wear a policeman's star and uniform and will devote all of his time to the work.

Chickenpox at Goat Island Naval Station.—All anxiety over the health conditions at Goat Island naval station, where some disease like smallpox broke out, has passed away, and the place is reported free from any serious sickness, the temporary quarantine being raised. The disease has proved to be chickenpox.

Another Myth Exploded.—Some months ago a report reached England from Africa of the discovery of a plant, one of the basil family, which was obnoxious and even fatal to mosquitoes. The story excited interest and was fortified immediately, as all such tales are apt to be, by the testimony of persons who had known the plant all along, being intimately acquainted with its virtues, and had slept in happy immunity from mosquito attack in pestiferous tropical regions, after taking the simple precaution of hanging up a few basil leaves. It has now been proved beyond peradventure that all these yarns were the outcome of a profligate imagination or a malicious intent to deceive. The Governor of Sierra Leone has caused a number of exhaustive experiments to be made, the results of which prove conclusively that the mosquito cares no more for the basil plant than he does for the rights of the individual. If anything, he appears to have a mild sort of liking for it. Certainly he does not try to avoid its presence, or suffer any inconvenience from it. He will perch upon it unhesitatingly, sit upon it while

meditating or completing his toilette, and eat his dinner under its shadow with the utmost nonchalance and satisfaction. Even when shut up in a bottle with it he lives for days or until he dies of hunger. But if you get a heap of basil leaves and set fire to them in your chamber, and keep on burning them until the smoke is so thick that you are reduced to a choice between instant flight or death by suffocation, any mosquito who is in your company will exhibit signs of discomfort. He may even swoon, but, so say the scientific experimenters, a little fresh air will speedily revive him. On the whole, the great basil mosquito cure must be relegated to the limbo of exploded frauds.

Another Mosquito Peril.—"The announcement of a new and infallible method of exterminating mosquitoes no longer excites more than a languid interest, this week's contribution to science being at least the third of its kind since the summer began," says the Evening Post. "The high note of the alto horn and the parasite with the terrible name of *Agamermis culicis* have been invoked in vain. We now learn that mosquitoes will die if the X-ray is turned upon them. True beyond a doubt, but has the New Jersey physician reflected that mosquitoes are bound to die even when the ray is absent? The principle of post hoc, propter hoc has certainly been overworked in the discussion of the mosquito problem. The finding in holes and corners of the grisly carcasses of *Culex* and *Anopheles*, creatures whose whole life history may be comprised in a couple of weeks, does not prove the success of destructive agents. It is not to be doubted that, if a man should recite Gray's Elegy to a roomful of mosquitoes, some of his little foes would drop dead even before he reached 'Here rests his head upon the lap of earth.' It may be recalled that Alice, when she was being instructed in regard to the insects of Looking Glass Land, inquired what would happen if the bread and butter fly should fail to find its necessary 'weak tea with cream in it.' 'Then it would die, of course,' replied the gnat. 'But that must happen very often?' objected Alice. 'It always happens' was the gnat's answer. It will not do to forget in our experiments that the same thing is true of the mosquito."

Missouri Valley Medical Society.—The annual meeting of this society will be held in Omaha, September 14-15 (instead of 17, as previously announced). This change has been made at the request of the Committee on Arrangements. The Governors of the Knights of Aksarben have asked the members to be their guests on the evening of September 14. Invitations will be issued in due time to all members who signify their intention of being present at this meeting. Those desiring to contribute papers should send their titles to the secretary at once, in order to secure a place upon the program. A symposium on skin diseases will be a feature of the first day.

The Psychology of Sleep.—Under the caption of "The White Man's Intellectual Burden," the New York Sun contributes somewhat to the enlivening of the dog days, saying that "a gifted native of Ceylon, P. Arunachalam by name, has just discovered that a chief defect of us Westerners is a habit of wakefulness, or rather an inability to enter into the third order of sleep. As for the first and second orders, we are said to do fairly well. The first, it appears, is plain Western dreaming, or, in the finer language of the East, the discovery of 'an inner world full of intense life and emotion.' The second, unconsciousness of existence, followed, on waking, by the memory of 'a blissful haven of rest'; in plain English, sound sleep. The third is the 'sleep of light,'

otherwise 'luminous sleep,' and it is under the head of 'Luminous Sleep' that the Singhalese philosopher publishes his advice to the Western world. Now it is in this quality of somnolent luminosity that we are so deplorably backward; we can sleep and dream and we can sleep without dreaming and we can dream without sleeping, but what we cannot do is to 'lift the veil of sleep' and let in the light. But there is still hope for us; a few have acquired the habit and what we chiefly need is cultivation. For, as the author of this little pamphlet points out Tennyson, among others, achieved to the third estate by often repeating his own name, till—to quote his own words—'all at once, as it were out of the intensity of the consciousness of individuality, the individuality itself seemed to dissolve and fade into boundless being; and this not a confused state, but the clearest of the clearest, the surest of the surest; utterly beyond words, where death was an almost laughable impossibility . . . etc.' 'If the science of the spirit,' remarks the writer, commenting on this curious autobiographical confession of the poet's, 'were cultivated in Europe as it is in India . . . what heights might not so ripe a soul have scaled, what blessed vistas might he not have opened up to the West!'

"It is pleasant to find the Spectator, of London, considering this most abstruse and interesting suggestion with proper gravity in its physiological, psychological, moral, political and religious aspects, with due consideration of the duties of citizenship, of man in his relation to others and to himself; of the delicate distinction between credulity and faith, the broad distinction between religion and superstition, between civilized nations and savages, and finally between the white and the darker races. The discussion at last is reduced to the 'white man's burden,' which 'more truly even than the guidance of the empire,' is 'the feverish dominion of thought.' And this feverish dominion is, unhappily, disastrous to the estate of luminous sleep, which can coexist only with intellectual oblivion. So much for the matter from a political and moral standpoint. What of it psychologically considered? 'In dreams,' says our Eastern teacher, 'we joy, sorrow or rage, as keenly as in the experience of the waking world.' 'Surely not,' answers his sober English critic. 'Tragedies which would madden were we awake, and visions of delights that transcend the beauties and marvels of the material world in their gorgeous pageantry, are all forgotten by breakfast.' True enough; but surely in our sleep we 'joy,' as our Singhalese friend would say, over the most trivial delights, and mourn excessively over sorrows hardly understandable in our waking hours. And what if these dream-joys and dream-sorrows be forgotten on the arrival of breakfast? It is but reasonable that we accept the unities here as we do in what we of the West are pleased to call real life. And though a dream be winged, as Alectryon informed his master on a notable occasion, yet sleep hedges it in and limits its flight. Our manifest duty, then, in order to achieve the Eastern idea of contentment, is to cultivate perpetual sleep—the sublime and refined point of felicity called the possession of being well deceived.' Herodotus, the veracious, tells us of some nation or other that could nap six months together, and surely with a little practice one might learn to live through the rest of the year in the same comfortable state.

"There is, however, one manifest danger in this proposal. Should we all become perpetual sleepwalkers and frequenters of everlasting night, were there

not some risk of a superfluity of dreamers and poets, an excess of that wisdom and omniscience that is at present the possession of a favored few? To vulgarize such knowledge would assuredly be to stir up that old debate, happily set at rest years ago in the Schools of the Decree; whether the bat flying through the translucidity of the horned gate might not, spylike, discover the morphean visions turning and unwinding in circular fashion the thread of the *rete admirabile* that wraps up the *attili* of ill-caulked brains."

International Society of Ophthalmology.—The International Congress of Ophthalmology, which was held in Utrecht in 1899, elected Switzerland as the country for its next meeting. The undersigned ophthalmologists have been constituted the organizing Committee of the Congress. They have elected as President, the eldest of their Swiss colleagues, Professor Dufour; Vice President, Professor Pfüger; Secretary and Treasurer, Professor Mellinger, and Professor Snellen, President of the last Congress, Honorary President. The President of the Swiss Confederation, Mr. Deucher, M.D., has accepted the position of honorary president of the Tenth Congress of Ophthalmology. The Swiss ophthalmologists have enthusiastically received the news of the choice with which the Congress of Utrecht has honored their country. They have joined, and in their name an invitation is sent to take part in the coming congress. As the international congresses of ophthalmology meet every five years, the forthcoming congress will be held in 1904. Lucerne is the town in which the congress is to be held, the dates agreed upon being September 19, 20 and 21. These three days will be devoted to work, the mornings being reserved for *discussions*, the afternoons for practical *demonstrations*. Professor Snellen, Utrecht, President of the Ninth Congress; Dr. Barde, Geneva; Professor M. Dufour, Lausanne; Professor Haab, Zurich; Professor Pfüger, Bern; Dr. E. Landolt, Paris; Professor Mellinger, Bâle.

Colleagues desiring fuller information can obtain it from Walter H. Jessop, M.B., 73 Harley street, London; George Mackay, M.D., 20 Drumsheugh Gardens, Edinburgh; Henry R. Swanzy, M.B., 23 Merrionsquare, Dublin; Dr. De Schweinitz, 1401 Locust street, Philadelphia, U. S. A.; Dr. Coote, Quebec, Canada; Dr. Alfred Osborne, Alexandria, Egypt; who have been appointed correspondents for the United Kingdom and for the United States.

Tuberculosis Sanatorium at Scranton, Pa.—The sanatorium for consumptives was opened and received its first patient on August 3. The Society for the Prevention and Cure of Consumption will provide for 15 patients in tents during the summer and will erect permanent pavilions in the fall. It has purchased a 30-acre farm for this purpose, just outside the city limits, which has an elevation of 1,400 feet. Scranton is the first city to provide itself with such an institution by private subscription.

Obituary.—Dr. George W. Rolerfort, who was one of the most prominent negro physicians in New Jersey, and a Republican leader of considerable note in Essex County, died in Newark on last Thursday, of a stroke of apoplexy. He was stricken on Wednesday afternoon while in consultation with Dr. Livingston S. Hinckley, at the City Almshouse, of which Dr. Rolerfort was medical supervisor. Dr. Rolerfort had practiced in Newark for thirteen years and had acquired a large and lucrative practice and the respect of the medical fraternity. He was born at Lexington, Va., on June 20, 1860. He became a barber and earned enough to pay a tutor who en-

couraged him to go to Morgan College in Baltimore. During the summer he worked as a waiter at hotels and found at Water Gap a patron who paid for three years' course of study, which ended at the University of Pennsylvania.

Dr. Michael F. McGrath died of consumption at St. John's Church, Fishkill Landing, last Tuesday. His brother, the Rev. John J. McGrath, is pastor of the church. The deceased, who was thirty-five years old, was graduated from St. Francis Xavier College and the College of Physicians and Surgeons of New York.

Dr. Jannat Ernestine Hills died at the Willard State Hospital, Willard, N. Y., on July 11, 1903. She was a member of the medical staff of the hospital since November, 1895. She was born in Auburn, N. Y., in 1861, and was a graduate of the Woman's Medical College of Pennsylvania in 1893. After graduating she was for fourteen months an interne at the Sheltering Arms Hospital in Philadelphia, and afterward on the staff of the New York City Asylum for the Insane at Hart's Island. Dr. Hills was a member of the Seneca County Medical Association and of the New York State Medical Association.

CORRESPONDENCE.

OUR VIENNA LETTER.

(From Our Special Correspondent.)

VIENNA, July 15.

WOMEN STUDENTS IN ZÜRICH—AUSTRIAN MEDICAL STUDENTS' CONGRESS—UNIVERSITY LIFE IN BUDAPEST—MEDICAL STUDENTS AND THE ARMY—GERMAN DERMATOLOGICAL ASSOCIATION.

THE physicians of Zurich are greatly annoyed at a recently published novel written by Baroness Tlisc Frapau. She records therein the observations and adventures of a young female medical student; by the way displays a terrible picture of the Zurich clinics, and especially of the repulsiveness of anatomy. The "Work," which is based rather on vulgar gossip than on scientific researches, or on the writer's own observations, was perused by the director of the Zurich clinics, Professor Krönlein, and he contributes in the *Neue Züricher Zeitung* a sharp and energetic critique, in which he challenges the author's statements on the part of the medical students. The critique was as sensational as the novel itself. The polemic is not yet finished. This was a good opportunity for the male students to assert their opposition to the female students, and the men have requested that women be excluded from the University. This was not complied with on the part of Profs. Krönlein and Eichhorst.

The Austrian medical students have recently held a congress at Vienna, wherein medico-social and educational questions were discussed. At the sessions the professors of the medical faculty of the Vienna University also were present, and at the close the minister of education gave an address. The new regulations relating to the examinations for the "Doctor" degree are especially interesting.

Prof. Benedict spoke of the history of Austrian medical education. He pointed out the merits of Thun, who constructed the system of examinations in the year of 1850. According to these rules there were no compulsory examinations to pass during the course of a school-year. This rational system was superseded by the era of severe superintendence and compulsory examinations were established. The result of this innovation has been that to-day every medical professor complains of the low level of the examinations. According to Bene-

dict this system must be abandoned, because it leads to the neglect of the visiting of lectures, and it is a hot-bed for neurasthenia. He urges also the extension of the examining committee, in order to prevent one-sided questions. Billroth himself has said that 40 per cent. of the matter that one must learn for the examination's sake, is to be forgotten. Finally he holds that the half year—which a student must spend in military service—is quite superfluous.

Paul Libesny—a student—the leader of a previous action, which has led to very good results, demonstrated the deficiency of practical education. He urged that the material of country and district hospitals should be used for educational purposes.

Great attention was paid to the address of Prof. Schanta. He portrayed the miserable and insufficient location and staff of the clinics in striking colors. In providing for 3,000 labors (yearly) and an immense number of operations he has only two assistants. He disapproved of the habit of coaching, which is apt to spoil the ambition of the student, and moreover is very costly. It is to be hoped, that in the future, the assistants will receive such good salaries that they will not need to increase their incomes in such a manner.

The next speaker, also a medical student, similarly deprecated the coaching system, which besides other disadvantages induces the student to procure his practical knowledge outside the clinics. Dr. Sachs, a lecturer, on the contrary thinks that coaching, as such, is an important means of medical education.

The professional committee of the Budapest Royal Hungarian University elected at their session held on June 30th for dean Prof. Louis Thanhoffer, the renowned histologist; as secretary, Dr. Árpád de Bokay, professor of pharmacology; as notary, Michall Lenhossek, professor of anatomy; as librarian, Prof. Högyes, director of the Budapest Pasteur Institute.

The Minister of War has decreed that for native students who desire to enter the military service the sums of 480, 720 and 1,008 crowns a year shall be paid to them to aid them in the medical studies, during the last three years.

The eighth congress of the German Dermatological Society will be held at Sarajevo (Bosnia) from September 21st to 23d. The preparatory work will be done by a committee under the supervision of Dr. Lipot Glück, sanitary superintendent. The Bosnian government has not spared expense in encouraging a full meeting. It has provided free transportation to the Society from Bosna Brod (the limit of Bosnia) to Sarajevo and from thence an excursion train through Mostar to Ragusa on the Adriatic sea. Other excursions are also planned. The members of the congress and their families can be provided with full board during their stay in Bosnia and Herzegovina for very moderate amounts. Nominally they will be furnished in first-class hotels with everything except beverages for three days for fifty crowns. On the 19th of September the members of the congress will pay a visit to the urological and dermatological section of the Royal Hungarian Medical Society at Budapest.

Those intending to attend can get full information from Dr. Adolph Erdős in Sarajevo, Austria.

Static Work and Respiratory Metabolism.—That the consumption of oxygen and elimination of carbon dioxide are not always proportional to the amount of work performed by the body, is proved by the experiments of A. BORNSTEIN and E. POHER (*Prüger's Arch.*, Vol. 95, Nos. 3-4). They find that in the case of static work, such as holding a weight out at arm's length, the metabolism does not increase proportionately to the weight carried, but at a greater rate.

SOCIETY PROCEEDINGS.

BRITISH MEDICAL ASSOCIATION.

Seventy-first Annual Meeting, Held at Swansea, July 28, 29, 30 and 31, 1903.

FIRST DAY.

Presidential Address.—Evolution of Antiseptic Surgery.—Dr. T. D. Griffiths delivered his address at the adjourned meeting of the evening after the Report of the council and the election of honorary members had been made. His address was in part as follows:*

"I have chosen for the subject of my address the evolution of antiseptic surgery and its influence on the progress and advancement of bacteriology and therapeutics, and the further practical application of our knowledge for the benefit of mankind. This subject is no doubt full of interest to us all, but it is far too long to be treated fully in the short space of time in which I have the honor of addressing you.

"In the first place, I must ask your indulgence to bear with me for a few minutes in reminding some of you of the practice of surgery, as we witnessed it in the best London hospitals some forty years ago. There are probably many of the younger members of the profession who have no conception of the condition and state of things in surgical practice even at so recent a period. During my student days in the latter end of the Fifties and early Sixties the large wards of our hospitals were filled with all sorts of cases indiscriminately—simple and compound fractures, suppurating joints, traumatic, senile, and hospital gangrene, erysipelas, septicemia, pyemia, and cases operated on for accidents and diseases, all of which were dressed by the same attendants. Each ward had its set of sponges for the purpose of dressing wounds, and these were used indiscriminately for the various cases under treatment. There was no such thing as absorbent cotton wool in those days, and great economy was observed in the use of lint. Linseed meal and charcoal poultices were frequently employed to sweeten and cleanse wounds and to encourage healthy suppuration. "Laudable pus" was a sign of good dressing and healthy action!

"The operating theater was often crowded with students from the dissecting room, and at the operations the great surgeon invariably wore, with evident pride, the same old black frock coat, buttoned up to the chin, which was kept ready for the occasion in the anteroom, and which was well stained and saturated with blood and matter. It is unnecessary to give a detailed account of the operations, but I may mention that the sponges which were used in the wards were also used at the operating table. Stout silk ligatures were employed to tie the blood vessels, and were left hanging out of the wound to be pulled at from day to day until they were separated by the process of suppuration.

"I well remember listening on one occasion to a clinical lecture on pyemia, which was delivered by the senior surgeon of a London hospital, who confessed to the students that the causation and vagaries of pyemia were inexplicable. To illustrate this remark, he reminded his class of a strong, healthy young man, who had been admitted to the hospital for a trifling accident, and who died shortly afterward of pyemia, while a middle-aged, drunken abandoned woman in the adjoining ward was convalescent after a serious operation.

"The dawn of antiseptic surgery was now not far off. Schwann's discovery of organic germs in the air led Pasteur to formulate a theory that fermentation is never excited except under the influence of microscopic

organisms; and, further, that each particular organism sets up a peculiar species of fermentation. In 1861 Pasteur published the results of his researches on fermentation, and in 1863 he demonstrated that putrefaction was caused by minute organisms suspended in the air. Prior to this oxygen had been regarded as the agent which produced it.

"Lister, now aided by the result of Pasteur's researches, devoted his talent and energies to solving the problem of inflammation and its attendant suppuration in wounds. He was not long in arriving at the conclusion that it was due to decomposition—putrefaction—and he naturally evolved the idea that if decomposition of blood serum and destroyed tissue in wounds could be prevented, Nature would repair the parts much in the same way as she did in cases of simple fracture. He applied this principle to the treatment of wounds in his practice in the surgical wards at the Glasgow Infirmary, and afterward in Edinburgh, and used carbolic acid as his antiseptic agent.

"At the annual meeting of this Association held in Dublin in 1867, Lister communicated to the world the result of his investigation, and clearly enunciated the principles of antiseptic surgery, which we recognize and practise to-day. Naturally the practical application of these principles has since been gradually modified and improved. The use of the carbolic spray, which was at first a prominent feature of Lister's method, was gradually discontinued. It was found very inconvenient in practice, and not so necessary as it had been anticipated, and it was finally renounced by Lister himself in 1887. When the spray was given up greater attention was paid to the purity of the atmosphere in the hospital ward, and more especially in the operating theater, and of the instruments and dressings. Then, by a natural transition, attention was turned to the possibility of asepticism, with the view of discarding antiseptics at operations, and for the dressing of wounds.

"After some experience, not a few argued that the acme of success in surgery could be attained by the proper use of aseptic means. There is no doubt a great amount of truth in this, but not to the extent claimed by the advocates of asepticism. It must be admitted that the purest air which we can obtain in the operating theater contains micro-organisms, and some of these must alight on the surface of exposed wounds. Fortunately, there is far less danger of septic action being set up by micro-organisms floating in the air than by those which are conveyed to the wound by a foreign substance. The reason of this is probably that the pathogenic micro-organisms suspended in the air are less numerous, and, as a rule, less active than those which rest on solid or liquid substances. When no antiseptic lotion or swabs are used the aerial micro-organisms settling in the wound are left to the digestive cells and phagocytes to be disposed of. In ordinary circumstances and with proper aseptic precautions they are able to do so; but it cannot be denied that this delegation of trust to the cells, coupled with the possibility of imperfect sterilization of the skin and materials used at the operation, involves greater risk of disasters (such as are not unknown to some of us) than when antiseptic means are also used. We must be careful that the pendulum does not swing too far to the aseptic side. It is at all times a difficult matter to guard the surgeon's work effectually by means of sterilization against every possible access of pathogenic micro-organisms. Why should one trust to asepticism alone when the position can be made impregnable by the assistance of antiseptics, which are practically harmless to the healing process? It is therefore evident that the acme of safety is secured in operative surgery by the judicious application of the two principles advocated and practised by Lister.

*From advance sheets of the British Medical Journal, by courtesy of the Editors.

"The architect has been very rightly called into service to further the practical application of Listerism. This is especially to be noticed in the construction of modern hospitals, and in the addition of new operating theaters to old institutions. They are invaluable in surgical work.

"Some thirty-six years ago the mortality from major operations in the London hospitals was about 33 per cent. This high mortality, after major operations, is now reduced to about 3 per cent., and, after minor operations, practically to nil, as the outcome of Lister's antiseptic surgery.

Nursing Institutions and Surgical Homes.—"We are now doing, with the aid of public charity, all that science up to date can do to help the poor. Let us now consider for a moment what has been done, what is being done, and what should be done to meet the requirements of the middle classes for medical and surgical aid in time of need. Their own homes, or perhaps lodgings are often unsuitable for operative surgery, or for serious medical cases requiring skilful nursing. There are, it is true, many surgical homes in our large towns which are, with very few exceptions, private ventures for profit, many unworthy of recommendation.

Bacteriology and Immunity.—"The brilliant discoveries of Pasteur and the evolution of antiseptic surgery by Lister gave a great impetus to the study of bacteriology, with the result that new and unexpected discoveries were made as to the part played by bacteria in nature. We now find that these micro-organisms have a definite and important place in the scheme of nature. They are distinctly separated by gradation from both the vegetable and animal kingdom. They form a kingdom of their own which we may term the 'bacterial kingdom.' Their very existence appears to be antagonistic to both animal and vegetable life. Their object in nature is evidently one of destruction—the breaking up of complex molecules of animal and vegetable substances into simpler combinations. They are Nature's scavengers, and undoubtedly they are the causal agents of all the communicable diseases to which flesh, and not human flesh alone, is heir.

"The varieties of bacteria, differing in size, form, action, character, and power for good or evil, are almost endless.

"The bacteria with which we are familiar measure from 1μ to $5\mu = \frac{1}{20000}$ to $\frac{1}{4000}$ in. If each bacterium measured $\frac{1}{20000}$ in. in length and $\frac{1}{20000}$ in. in breadth it would take 250,000,000 of these micro-organisms to cover 1 sq. in. of glass. These micro-organisms grow with great rapidity—a bacterium may reach maturity and divide or split into two in twenty or thirty minutes. If it is divided into two every half-hour it would produce a colony of over 16,000,000 in twelve hours. It has been shown in the laboratory that the growth and rapidity of production and the character of bacteria depend upon their surroundings, and that their virulence may be attenuated or increased according to circumstances. It is therefore evident that the law of evolution and involution of the animal and vegetable kingdoms applies also to bacteria. Supposing that the evolution of a new species of plant—say an annual—takes 336 years, then if the law is equally applicable to micro-organisms, a bacterium under favorable circumstances would take only one week to run through 336 generations, provided it took only thirty minutes to reach maturity and division, and so a new species might be thus rapidly evolved.

"I wish also to remind you, for the purpose of my argument, of the important fact that a bacterium may have two states or stages of existence. One is the active or vegetative stage, and the other the spore or resting

stage. In the latter state, which may be compared to that of a hard nut or seed, it may remain dormant for a long time until the surroundings favor its development into the active state. This, as I shall show, has an important bearing on the treatment and etiology of specific diseases.

"Pasteur's and Davain's discoveries led up to Koch's investigation. Davain discovered bacteria in the blood of animals suffering from anthrax in 1863, thus confirming the observations made by Pollender in 1849. Koch repeated the experiments and finally established in 1876 the causal relationship of bacteria and disease. Tuberculous disease had been proved by Villemin to be inoculable, and in some countries it had long been believed to be infectious, but it remained to Koch to demonstrate, in 1882, that tuberculous disease was due to the agency of a micro-organism. He proved that a bacillus played a part in the production of tuberculosis which is analogous to that which is played by *torula cerevisiæ* (yeast bacillus) in fermentation. The tubercle bacillus feeds, grows, multiplies and produces its toxin at the expense of the surrounding tissues, very much in the same way as the yeast bacillus feeds, grows, multiplies, and produces its toxin (alcohol) at the expense of the saccharine solution in which it is placed. The principle discovered by Pasteur in the processes of fermentation and putrefaction was proved, after years of close investigation by Koch, to be absolutely identical in the development of tuberculous disease in the animal body. He demonstrated the bacillus in the tissue, and cultivated the organism outside the body, and observed the formation of the toxin. The same remark may be applied to diphtheria (diphtherization). Diphtheria bacillus grows, feeds, and multiplies on the mucous membrane and there forms its toxin.

"If we compare the processes of fermentation, tubercularization, and diphtherization a little further, we may gain an idea as to the nature of immunity, which is far more rational than any of the numerous and complicated theories and suggestions already proposed.

"After a certain stage of fermentation *torula cerevisiæ* (the fermenting agent) ceases to act, it becomes inert and falls to the bottom of the vat. Tubercle bacilli and other pathogenic bacteria behave in exactly the same manner. After a certain stage of crowding and production of toxin they become inert, and are at last practically killed by their own poison. The same thing happens in the overcrowding of animals.

"When yeast has ceased to perform its functions in the vat the alcohol (fermentation toxin) which it produced, if not protected artificially, is attacked by another bacterium, the germs of which are always at hand, and it is soon reduced to vinegar, which possesses different properties. Even if more must is added to the vat the acetic acid fermentation will continue. It is well known that the toxin produced by one bacterium can be destroyed or metamorphosed by the action of another. Advantage has already been taken of this power by sanitarians for the disposal of sewage, aerobic and anaerobic bacteria being called into service to do the work desired.

"When the pathogenic bacteria are destroyed by their own poison, and when this poison in its turn is metamorphosed into a simpler compound by other bacteria, in the same way as alcohol is changed into vinegar, the patient is convalescent, and as long as the spores of the second bacteria remains in the blood, the patient is rendered immune;* but if the toxin of the first pathogenic bacteria has been removed by the leucocytes or destroyed by the oxygen of the red blood corpuscles, or, in fact, digested, or if the spores of the second set of bacteria are no longer retained in the circulation or tis-

* Rheumatism produces immunity to tuberculosis, and vice versa.

sues of the body, the patient has no immunity. When the germs which secure immunity become attenuated, the immunity is lessened, and when they are destroyed the immunity is lost for the time.

"In convalescence after diphtheria the toxin, which may be called for convenience sake 'diphtherin,' is no doubt metamorphosed, and its toxic character is destroyed by another ferment, and the new or metamorphosed product may be called 'met-diphtherin.' As long as the met-diphtherin, or its causal agent, remains active or dormant, it confers immunity on the individual body which it occupies. Diphtherin antitoxin is the met-diphtherin obtained from the horse's blood, which confers immunity on the human subject. When this is used at an early stage of diphtheria it damages the vitality of the diphtheria bacilli, and reduces their diphtherin to met-diphtherin, which is harmless.

"Pasteur demonstrated that when grapes are ripe in October a large number of the berries and their stems have their skins covered with spores of *torula cerevisiae*, ready to develop under favorable conditions. This happens immediately when the grapes are crushed and the solution is kept at a proper temperature.

"He also demonstrated that yeast can be weakened (attenuated) by nursing it in a weak solution of sugar, until eventually it is unable to cause any fermentation.

"We may also study with advantage the processes of sporulation and vegetation of yeast cells, which are analogous to those of pathogenic bacteria. By the process of sporulation the yeast cell contracts and hardens like a grain of corn, and retains its vitality in this condition for months or years. The same is also true of pathogenic bacteria, which exist either in the state of vegetation or sporulation.

"Professor Sims Woodhead pointed out at our annual meeting last year that diphtheria bacilli may remain dormant in the spore stage in the throat for months. This is an important fact worth remembering, inasmuch as it may account for anomalous outbreaks of acute specific disease.

"Considering the rapidity with which bacteria grow and attain their maturity and multiply, and considering how easy it is to attenuate or increase their virulence, it is logical to infer that the process of evolution may be brought about very quickly, as has already been pointed out. It is therefore natural to infer that, under favorable conditions, *Bacillus coli communis* may be developed into *Bacillus typhosus*, both being alike in size, shape, and appearance, and the so-called pseudo-diphtheria bacillus into diphtheria bacillus, which are also alike in appearance, etc.

"Like the ripe grapes with germs of yeast in the dust on their skins and the surface of their peduncles, we also have germs of specific disease about us which only require certain conditions to develop them. The late Sir James Paget, in his memorable address at the International Medical Congress in London, in 1881, dwelt at some length upon the importance of studying the physiology and pathology of plants to help the advance of knowledge of human pathology.

"Nature always works on definite plans, but with ever varying difference.

"Bacteriology has done much to unravel the mysteries of pathological processes, and it will do still more to advance our knowledge of medicine.

Therapeutics.—"Both bacteriology and Listerism have greatly helped to advance our knowledge of the action of medicine. Therapeutics have now been raised in many departments from the plane of empiricism to that of science. Peruvian bark, the active principle of which is quinine, was accidentally discovered to be of great value in the treatment of malarial fever. The

discovery was the result of observation, but the knowledge gained was entirely empirical. Prior to the discovery of the hæmameba and the observation of its action on the red blood corpuscles, and until the Listerian property of quinine was ascertained, we had no idea how the drug acted as a curative agent. It is now evident that it acts simply as an antiseptic in destroying the malarial parasites which are conveyed to the human body by mosquitoes, and it is now very doubtful whether it has any other beneficial action as a therapeutic agent. The world is greatly indebted to Dr. Manson—whose name we were glad to see in the last Birthday Honors list—and to Dr. Ross, for their discovery of the part played by mosquitoes in the causation of malarial fever.

Salicin.—"Very much the same remarks may be applied to salicin, salicylic acid, and the salicylates, which are powerful antiseptics. The discovery that these drugs were specially valuable in the treatment of rheumatic fever was accidental also. It is now acknowledged that rheumatic fever is due to a micro-organism which probably gains access to the circulation through the tonsils or mucous membrane of the pharynx. Sore throat is a frequent precursor of acute rheumatism. It is probable that scarlatinal sore throat predisposes the patient to infection by rheumatic micro-organisms, over which the salts of salicin have a lethal action.

"**Mercurial Salts** are the most efficient antiseptic agents we possess in surgical practice, and it may be argued that the therapeutic action of mercury, when administered internally, is to be accounted for to a great extent by its antiseptic property; hence its specific action on syphilis, which is now stated to be a bacterial disease. It has been recognized for many years that mercury is a valuable remedy in tonsillitis, which is also, no doubt, caused by micro-organisms. Dr. Jamieson, of Edinburgh, pointed out some years since (*British Medical Journal*, 1887) that mercuric chloride is most valuable as a bactericide in the treatment of scarlet fever.

"**Arsenic**, like mercury, a valuable remedy, is a powerful bactericide. It has been stated lately, on very good authority, that it is useful in the treatment of tuberculosis. It is well known as a most valuable remedy in malarial diseases. Its lethal action on other micro-organisms, which we have not yet discovered, may account for its therapeutic value in the treatment of anemia, pernicious anemia, skin diseases, and degenerative changes which are attributed to 'premature old age.' It is possible, and very probable, that micro-organisms are active agents in the production of atheromatous changes in the vascular system. We now acknowledge that the deposit of tartar on the teeth is the product of certain bacteria; even the gouty deposit in various tissues of the body should probably be credited to some as yet unknown bacilli. In any case, the facts before us are sufficient to justify the suggestion as a working hypothesis.

"**Iodine** is another powerful antiseptic agent and a cell stimulant favoring absorption of exudative and inflammatory products; as it possesses these two properties to a high degree, and is readily tolerated by the animal economy, it ranks among the most useful remedies we have in our *Pharmacopœia*.

"**Iron** may act as a powerful antiseptic remedy indirectly. In cases of anemia it improves the condition of the red blood corpuscles which are the carriers of oxygen in the animal economy.

"The local treatment of skin diseases, as well as those of the mucous membranes, may be briefly stated to be a judicious use of antiseptics alone, or in combination with some sedative or stimulating agent, as the case may require.

"Time will not permit me even to enumerate, much less to expatiate on, all the antiseptic agents which we have now at our command.

"We now see that Listerism is as valuable in the practice of medicine as it is in surgery.

Public Health.—"The practical application of our knowledge for the benefit of the public health has not kept pace with the great progress made in medicine and in surgery during the last thirty-six years. The Public Health Act of 1875, which was very comprehensive and well conceived, has been of great service in improving the sanitary condition of urban and rural districts; but, in spite of the amending Acts, and in spite of the Local Government Act of 1894, it is now clear that both the law and its administration are defective in many points, and the time has come when both should be improved in order to secure for the public the full benefit of the advance recently achieved in the science of hygiene by bacteriology and the principles of Listerism. Thus, while it is true that every urban rural sanitary authority is required to appoint a medical officer of health, the duties and salary of the officer are left to the discretion of the local authority, except in those cases in which part of his salary is repaid by the Local Government Board. Rural sanitary authorities are generally satisfied with very little more than the exercise of their power of electing their officer and the fixing of a small salary. The officer, who is as a rule a local practitioner, is allowed to limit his own work as he may think proper; and as the tenure of his appointment is precarious, he is naturally disposed, in the performance of his duties, to interfere as little as possible with individual interests; practically he has no power to correct matters which come under his notice.

"A few months since, a conscientious medical officer of health confessed, in a letter which appeared in the British Medical Journal, that he was paid about £50 a year for doing nothing. The principle of action which he had to observe was 'how not to do it.' The medical officer's reports consist principally of statistics—the number of births and deaths per thousand living, the number of deaths from acute specific diseases, etc.—which are, no doubt, very interesting and instructive, but these details could and should be supplied to the Board of Guardians by the registrar of births and deaths. It would be far more to the point if the medical officer of health were allowed or required to report how many houses were badly drained, how many houses were unfit for human habitation, etc. Speaking generally, the appointment of the medical officer of health in a rural district is very little better than a farce, and waste of public money.

"Now it may be argued that sanitation in rural districts is of comparatively secondary importance since in the country there is plenty of space and pure air; and that, in fact, the mortality in rural districts is lower than in the country as a whole. But there are many fallacies in such a line of argument, and I propose to direct your attention to one. It has become too much the custom to gauge the sanitary state of the country by the general death-rate; a decline in the rate has, perhaps, tended to blind us to facts which lie a little below the surface. It is true that during the last thirty years the annual death-rate of all ages in England and Wales has fallen from 22.25 to 16.3 per thousand living, a gain of about 26 per cent.; but the death-rate of infants under 1 year of age has risen nearly 2 per cent., while the birth-rate has diminished. Nearly half the children born are dead within five years. Increased infant mortality and diminished birth-rate are two ugly facts which are not to the credit of our country or of modern civilization. The increased mortality among infants is

due to diarrhea and enteritis, and we find that the increase due to these two causes is seven times greater in towns than in the country. We also find that the mortality from diarrhea is much greater among infants artificially fed than among those which are fed at the breast alone, or in part. No doubt much of this increased mortality is due to the ignorance and carelessness of mothers and nurses; but it is also an illustration of a defect in our sanitary administration due to the optional character of the acts and regulations already referred to. There are in existence model rules and regulations for the cleanly and sanitary conduct of dairy farms, which, though they have been approved and sanctioned by the Local Government Board in England, are not adopted, or, where they have been formally adopted, are not enforced in rural sanitary districts. The medical officers of health of our great cities complain that, owing to the neglect of rural sanitary authorities, the milk supplied for consumption, especially in the poorer quarters of large cities, is often either decomposing or putrescent.

"The illustration which I have given shows that we must regard our system of sanitary administration as a whole, and must not be content with enforcing sanitary precautions in the cities while neglecting their application in the country districts, from which those cities draw their supplies.

"Notwithstanding the defects in the administration of the Public Health Act, the country is often under a debt of gratitude to sanitary authorities and medical officers of health for protecting our shores from the invasions of plague and cholera from time to time. The importation of plague to Glasgow and to the London Docks, a couple of years ago, is still fresh in our memories, and we have not yet forgotten the feeling of relief we experienced when we were assured that the causal agents had been destroyed and that we had safely escaped a terrible calamity. Great credit is due to the sanitary authorities for their promptitude, energy and determination in the performance of their duty on these occasions. The same may be said of our local authorities generally when an epidemic of smallpox, typhoid fever, or some other infectious disease attacks a populous district. Unfortunately the public is apathetic in these circumstances; it must be hard hit, and many lives must be lost, before it wakes up to realize the situation, and give material help to the medical officer. We are indifferent and accustomed to the endemic and preventable diseases which are always with us, persistently destroying a large percentage of the population. This may be attributed to three causes: (1) The absence of a strong central authority; (2) the ignorance, apathy, and prejudice of the smaller authorities; (3) the objections and the loud protestations of faddists and conscientious objectors to vaccination, objectors to the Contagious Diseases Act, objectors to the advancement of medicine by experiments, etc.—a class of persons who, regardless of the consequence to others, claim freedom to do as they please in matters pertaining to health, freedom to do what is unjust and wrong, freedom to endanger the lives of others.

"And this is allowed in Great Britain, the land of liberty! Gentlemen, this is not liberty, it is undue license and abuse of freedom. Liberty means freedom and security, freedom of action and security to person and property, freedom of action with due regard to others. These conscientious objectors, of whom there are many species in the world, repudiate the conclusions and recommendations of our Commissioners. They claim freedom to break one of the Ten Commandments, and they also disregard one of the great moral principles of Christianity; and, moreover, they are allowed

to have a voice in the Government and the country, and considerable influence in Parliament! It is high time the country should be rid of this tyranny of faddism and ignorance which is responsible for the loss of tens of thousands of valuable lives every year.

"In obedience to the influence of democracy, the tendency of legislation for many years past has been in the direction of decentralization. Unfortunately this has been carried a little too far in the case of the Public Health and Local Government Acts. A healthy reaction is now much to be desired. The Sewage Commissioners, who are gentlemen of the highest abilities, have recently reported, and have pointed out 'the need of setting up a central authority.' All the various committees appointed by the Local Government Board to consider and report on questions relating to food, questions of preservatives, coloring matters, beer materials, and adulterations of food products have made similar recommendations—namely, the necessity of setting up a greater central authority to secure intelligent coordination and direction and a satisfactory administrative control.

"Here the matter ends. The recommendations of commissions and committees are put on one side. Questions affecting the health of communities and of the nation at large are presumably not urgent! Both Parliament and the country are more interested and concerned in trivial and sentimental questions of religious teaching in Board schools than in the physical and mental development of our children. The Opposition, whichever party be in power, apparently prefers wasting the Legislature's time in wrangling over a dispute between a set of recalcitrant quarrymen and their employer to devoting itself to an amending Act to secure better health, longer life, and greater comfort to the community for which they legislate.

"It is evident that the reform we need is greater central authority and greater power to county councils over public health administration within their respective areas, and for this purpose it appears to me that the following scheme would meet the case:

"1. That the President of the Local Government Board should be raised to the rank of Secretary of State, on an equality with the Home Secretary, for the purpose of improving the status of the central authority. It is true that Mr. Long is a member of the Cabinet; but that is not due to the fact that he is President of the Local Government Board.

"There is, I understand, an agitation going on at present to establish a Ministry of Public Health. This at first sight appears to be the very remedy required; but on second thought it is evident that this would defeat its own end and prove a retrograde step. We must remember that the administration of public health in this country is almost entirely local; and we must not forget that the local administrable business of the country, for which the Local Government Board is trustee, and the business of public health are inseparable; it therefore follows that an independent Minister of Health would be in constant collision with the Local Government Board, and the result would be friction and a deadlock.

"2. (a) That the county councils, urban and rural sanitary authorities should be under compulsion to appoint medical officers of health who should be precluded from private practice. (b) That the county councils should also have power to compel the combination of small sanitary authorities into conjoint areas sufficiently large to secure the services of an efficient medical officer who should give his whole time to public health work. In short, a public health service should be developed to provide the efficient medical officers of health, who are

absolutely necessary. The service should be sufficiently tempting to induce some of the best talent in the profession to enter it. The young medical officers of health should begin their work in rural or less important districts, to be promoted, according to merit and seniority, to higher or more important posts with increased salaries. The appointment, in the first place, should be competitive; the tenure of office should be secure; and there should be provision for superannuation. The medical officers of health should have competent sanitary inspectors as at present; their duties should be specified, and they should have the power to carry out the work prescribed for them, very much in the same way as responsible officers in other services. Every medical officer of health should be provided with a bacteriological and chemical laboratory, and the services of an analytical chemist. Laboratories of this kind, properly equipped, which are now few and far between, would also be an invaluable help to general practitioners and specialists.

"One of the duties of the medical officer should be to deliver popular lectures on sanitary questions, and hygiene generally, in his district for the purpose of educating the public on the vital importance of observing the ordinary laws of health. The sanitarian motto should be that which the late Lord Beaconsfield once gave to his party, 'Educate—Educate—Educate.'

"Although it is well to advocate the establishment of sanatoria for the cure of tuberculous diseases, it is far more important and much more logical to go to the root of the evil at once and teach the public the importance of healthy houses, good drainage, proper ventilation, hygienic dressing, and wholesome diet. Prevention is better than cure.

"*A Modest Estimate.*—A moderate improvement in our present sanitary administration would, no doubt, result in a reduction of 1.5 per 1,000 living, in our annual death-rate. Supposing then that the population of the United Kingdom be 40,000,000, the saving of life would amount to 60,000 a year—a total of 1,200,000 in twenty years. A creditable asset even to the British Empire."

SECOND DAY.

Infective and Infectious Diseases.—Dr. F. T. Roberts, of London, gave the address in medicine on this subject. He said in part that it may be taken for granted that when the pathological factor or factors which directly originate a particular disease or group of diseases, about which there had previously been but vague theories and hypotheses, have been definitely recognized, and their true nature established, we may claim that a distinct and important advance in knowledge has been gained. This applies emphatically to the whole range of complaints with which I am now concerned, for the term "infective," according to modern teaching, has come to have a very precise pathological signification, founded on a scientific basis, and the outcome of the researches and experimental investigations of Pasteur, Lister, Koch, and their followers. To this doctrine the medical faculty generally, with but comparatively few exceptions, have given their cordial and uncompromising assent. It affirms that every infective disease is the result of the direct action upon the body of one or more living pathogenic micro-organisms or bacteria, and in many instances it has been positively demonstrated that a specific organism is the cause of a particular disease, and of no other. It must be clearly understood that according to this definition the term "infective" is not synonymous with "infectious," which implies that a complaint is capable of being communicated, either by direct inoculation or contagion, or indirectly in various

ways, from person to person, or from some other animal to man. In short, an infectious disease must be infective; but an infective complaint is not necessarily infectious. He continued thus:

"I need scarcely remind you that a number of contagious diseases have long been known to be due to obvious or easily demonstrable parasites, animal or vegetable, and it is interesting to note in passing that the investigations of recent years have added, and are still adding, to this list, of which actinomycosis may be cited as a conspicuous example. The organisms we are now dealing with, however, are on an infinitely more minute scale, and the profession as a body have to accept in the main what trained bacteriological experts tell us about them, their toxins, pathological effects, antitoxins, and other details. The theory of *contagium vivum* is of very ancient date, but the positive demonstration of the nature of the so-called virus was only started, and has been progressively accomplished well within the last half century; while the investigations which are still going on in all directions are adding daily to our knowledge and to the practical results following therefrom. These investigations, however, have shown that there are still not a few difficult questions to be solved, and we must be on our guard against too hasty conclusions or generalizations on insufficient data. It is a remarkable fact that in the case of some of the most prominent infectious diseases with which we have long been familiar, no definite or specific organism has thus far been recognized, at least so as to be acknowledged by competent and reliable authorities, and we cannot accept the alleged discoveries of such organisms in individual complaints, unless and until they have received the stamp of the approval of such authorities. At the same time we may be certain that they exist, and this fact may be accepted as the basis of a sound working hypothesis.

"When we look back upon the history of medicine during the past half century, but more especially during recent years, we can not avoid being struck with the additions which have been made to the group of infective and infectious diseases, and with the way in which others, though previously known, have come so much more prominently to the front. The multiplication of these complaints has been partly due to the differentiation of diseases which were formerly regarded as identical, as the result of careful and systematic clinical observation and post-mortem examination. It is, however, to the revelations of bacteriology that we mainly owe these additions, which in the first place have brought all inflammatory, suppurative, and septic conditions within the infective group. Among special medical diseases coming under these categories which, according to modern views, are thus definitely classed as infective, may be mentioned pneumonia, rheumatic fever, gonorrheal synovitis, possibly rheumatoid arthritis, malignant endocarditis, certain acute throat inflammations, and different forms of meningitis. But, further, bacteriology has proved conclusively that several unsuspected complaints or morbid conditions, are infective or even infectious, of which the most remarkable are tetanus, tuberculosis, and malaria. Influenza and diphtheria are striking examples of infectious diseases which seem to have developed into terrible scourges within living memory, though they are by no means new complaints, and their prevalence can be easily explained in the light of modern knowledge. Anthrax and glanders have come to the front because they illustrate in a remarkable way certain important points relating to the pathology of micro-organisms. Glandular fever, specially studied in this country by Dawson Williams, is an interesting addition to the acute infectious diseases. I

have already alluded to malaria, and I wish now to draw special attention to the fact that the effects of this condition, as well as several diseases always known to be infectious, such as cholera, dysentery, plague, and yellow fever, which originate and prevail chiefly in tropical and subtropical countries, and with most of which we as a nation had formerly little or no direct concern, have nowadays assumed a conspicuous prominence, and have become of extreme practical importance. New diseases belonging to this category have also been, and are still being, brought to our notice, such as blackwater fever, Malta or Mediterranean fever, trypanosoma, sleeping sickness, and beriberi. So important have they become that 'Schools of Tropical Medicine' have been, as you are aware, established in different places for those who need special training in relation to these diseases. The free intercommunication which now exists between Europe and tropical countries, many of them far distant, has brought them to our very door, so to speak, and we are compelled to deal with them seriously, and to do what lies in our power to cope with them. And more especially Great Britain as a nation can not ignore these complaints, as many of the regions in which they prevail form an integral part of this vast empire. We are, I presume, most of us 'Imperialists' nowadays, but in this relationship, at any rate under existing circumstances, no one dare be a 'Little Englander!' We can not evade the responsibilities which the Imperialistic sentiment brings with it with regard to these terrible diseases, whether from the point of view of humanity and philanthropy; of trade, commerce, mining industries, or other remunerative enterprises in which this country is now so actively and widely engaged; of military engagements; or of Christian missionary work. In this connection I can not refrain from calling attention to the intelligent, far-seeing, disinterested, and truly patriotic efforts made by our distinguished countryman, Sir Alfred Jones, a native of Carmarthen, to promote the study of tropical complaints on the spot, as well as at the Liverpool School of Tropical Medicine, and to do all in his power to endeavor to diminish their prevalence and gravity, or even to exterminate them altogether.

Practical Etiology.—"I now proceed to deal briefly with certain points relating to what I may term the practical etiology of infectious diseases. With this aspect of the subject all members of the profession, whatever their position or sphere of work may be, are unavoidably and deeply concerned; and there is hardly any branch of medicine in which greater or more beneficent progress has been made, thanks mainly to those who have worked in the various departments of public health, and who have taken an interest in sanitation.

"Now the first question to be determined from the point of view of practical etiology is whether a particular disease is infectious, in the true sense of the term, or not? As I have already remarked, some affections have been in modern times definitely proved to come under this category, which previously could not be so regarded on any scientific grounds, of which tuberculosis is a conspicuous example. The dogmatic statements made on this point about other diseases, which seem to be undoubtedly infective, such as pneumonia and rheumatic fever, must, however, be received with caution until further and more extensive inquiry has been made, though in the meantime it may be well to regard them provisionally as infectious under certain circumstances, and to act accordingly. At the same time we should not ignore or forget the ordinary causes which long experience has taught us are capable of exciting these diseases, such as chill produced in various ways.

"In the next place, it is very desirable, with regard to each individual infectious disease, to have as definite a knowledge as possible concerning its period of incubation; the degree of infectiousness; and the period of infectivity, that is, how long infection lasts in a particular case? In relation to many of the best known affections belonging to this group, these points have been now established fairly accurately, but there is still much to be done in this direction. As regards the degree of infectiousness, undoubtedly the gradations in this respect between different diseases are by no means so clearly recognized as they ought to be, even by the profession sometimes, but more especially by the laity, and consequently one can not help being struck with the want of proportion and tendency to exaggeration exhibited in the way in which certain of these complaints are dealt with. For instance, phthisis is really nowadays looked upon by the large majority of persons as if it were a most virulent infectious disease, equal to smallpox or scarlet fever, which is of course absurd, but the idea has none the less got a firm grip, and is doing an infinite deal of serious harm in different ways.

"The most important and striking advance which has been made in relation to the practical etiology of infectious diseases is in our knowledge of the sources, modes, and channels of infection, both generally and with reference to individual members of the group; of personal predisposing conditions; and of the external circumstances which favor or promote their endemic and epidemic prevalence. On these matters our information was, within my own recollection, extremely vague and indefinite, and many most significant facts, with which we are now quite familiar, were utterly unknown and even unsuspected, except by a few intelligent observers and earnest workers.

"The question of the communicability of certain infectious complaints from person to person through the atmosphere is an extremely important one, especially when a number of individuals are aggregated together; as well as the distance to which the contagium can be thus conveyed, and the agencies which assist in its dissemination. This question is by no means settled in not a few instances. Let me refer more particularly to typhoid fever and smallpox. While typhus fever has always been regarded as a disease strongly infectious from person to person, typhoid fever has been practically dealt with by the large majority of the profession as being free from danger in this way. Now, however, the tendency undoubtedly is, and probably rightly, to be much more careful as regards enteric from this aspect, and there is a growing objection to the admission of typhoid patients into the ordinary wards of general hospitals. Smallpox is still more important. Of course it is a fact familiar to all that this complaint is highly infectious through the atmosphere, but how far it can be thus carried, particularly from a smallpox hospital or hospital ship, and the influence of winds in conveying the infective agent, is another matter, and may involve troublesome or even momentous consequences. I have noticed in the medical press recently directly contrary opinions on this question, expressed by those who apparently have had equal experience and opportunities of arriving at a practical conclusion. How far emanations from drains, sewers, defective water-closets, and the like, can produce so-called 'blood poisoning' and other indefinite infective conditions, is another question which needs clearing up.

"Passing now to the more practical results of modern investigations as to infection, the following facts are worthy of special attention:

"1. As a starting point infective micro-organisms have been found and demonstrated in the blood; in certain

secretions; in the excreta, urine as well as feces; in the cutaneous structures or shed epithelium; possibly in the expired air; and in specific lesions, morbid products, and discharges from the body of various kinds. Hence we can readily understand how and why most of the diseases with which these organisms are associated are likely to be transmitted from individual to individual; how the infected materials may contaminate fomites, and be thus conveyed far and wide; how they retain their activity in a dried state for an indefinite period, thus rendering apartments or other places infectious; and how they may be 'airborne,' being carried about by atmospheric currents or winds, and afterward either inhaled or swallowed by persons, it may be, far removed from the original source of infection, remote epidemics being thus not uncommonly originated.

"2. The communicability of certain grave diseases by the contamination of drinking water in different ways, but especially by admixture of infected excreta, is an established fact the importance and far-reaching consequences of which it is impossible to estimate or realize in any adequate degree. Why such contamination should take place is often obvious enough, but it is rather startling to be told, as we have been within a recent period, that unsuspected and most inviting 'spring water' may be a highly dangerous source of enteric fever. I have a very vivid recollection of an epidemic of cholera, and another of enteric fever, in Carmarthen when I was an apprentice, and in the light of modern knowledge there can be no doubt but that they were the result of infection through an excellent 'spring water' in common use, which had become contaminated with the specific excreta. While we are now all so familiar with the dangers of infected water, it required some hard teaching to convince the profession and the laity of its reality, and we ought never to forget the excellent work done by Snow, Beck, Ballard, and other pioneers in relation to this matter. Even at the present time, moreover, my experience has led me to the conclusion that these dangers are by no means always appreciated as they ought to be, and I have met with not a few glaring instances of the injurious effects of ignorance or carelessness. In this connection I may refer for a moment to the vigorous and praiseworthy efforts of my former pupil and friend, Dr. Leigh Canney, who at any rate is fully alive to the evils and risks of water infection, to establish a Royal Water Corps as a special section of the R.A.M.C., the functions of which it would be to prevent enteric fever, dysentery, cholera, and diarrhea. It does not look, however, as if his project had 'caught on' with the governing bodies, and no doubt there would be serious practical difficulties in carrying it out.

"3. One of the most striking additions in modern times to our knowledge regarding the conveyance of infection is in relation to food. In this connection milk and its products stand out very prominently, not only on account of their frequent contamination by infectious materials, probably mainly from the deliberate addition of tainted water to milk, but also because this valuable food may convey organisms directly from diseased animals by whom it is secreted. No doubt you are all familiar with the present controversy as to the communicability of bovine tuberculosis to the human subject in this way; but, notwithstanding Koch's dogmatic negative statement, more recent investigations, prominent amongst them those of Professor Hamilton, of Aberdeen, and Mr. McLaughlan Young in this country, seem to have demonstrated conclusively that this authority, in spite of his high scientific claims and standing, is entirely wrong. At any rate it would be a grave mistake to act on Koch's view, or to ignore in the

slightest degree the possibility of the conveyance by milk of the infective agents of tuberculous or other diseases. I will merely allude in passing to the probable danger in some cases of infection through meat, fried fish, uncooked vegetables, or various foods accidentally contaminated, as from being kept in infected rooms, or it may be by winds carrying organisms from a distance. But what shall I say about shellfish? Dare I whisper in this neighborhood the word 'oysters'? Unfortunately there can be no doubt but that these 'luxuries' are not uncommonly potent agents in originating enteric fever; and the same statement applies to the more humble and democratic mussels, cockles, or even periwinkles, as well as possibly to lobsters, crabs, and the like. May I venture to suggest that it is extremely desirable for all concerned, that everywhere the utmost precautions should be taken to prevent as far as possible these most desirable and valuable articles of food from being contaminated by sewage of any kind; and the deliberate feeding of oysters on such materials, for commercial purposes, can not be too strongly condemned, and ought to be put a stop to by the most stringent legal measures.

"4. The rôle which different animals play in the transmission of infectious diseases to man is another aspect of the subject upon which modern observations and researches have thrown remarkable light. Of course the relationship in this respect of such diseases as hydrophobia and glanders has long been recognized. The idea of direct infection through the milk or flesh of infected animals is of comparatively recent date. The danger of infection being carried directly by domestic animals, such as birds, cats, and dogs, from person to person, or perhaps because they themselves are suffering from certain diseases, is not yet appreciated as it ought to be. The rôle played by such unwelcome 'large vermin' as rats and mice in relation to plague, and probably some other complaints, is now familiar to all. Flies, cockroaches, and the smaller but too well-known personal vermin may no doubt be instrumental in conveying infection in certain cases, and flies may thus taint food. But the most remarkable and important revelations which modern investigators have given us as to the transmission of infection by animals are those relating to mosquitoes. The discovery and demonstration of the connection between these minute torturers of humanity and malaria, in which Sir Patrick Manson and Major Ross have taken such a prominent part, has already worked incalculable good, and promises in the future to revolutionize the conditions of life in many parts of the world, to the inestimable advantage of the communities who are native to the district, as well as of Europeans whom circumstances compel to reside there. The same statement applies to yellow fever, and probably to other affections prevailing in climates and localities where mosquitoes abound.

"5. The question of the relation of infection to soil, place, and particular houses or groups of houses, is a very important one, but about which there is at present much that is uncertain and indefinite, and that needs to be worked out more fully before any positive conclusions can be arrived at with regard to individual diseases. The fact that the tetanus bacillus comes from the soil, being especially associated with garden earth or horse-dung, is well established, and was a most interesting and important modern discovery. Beriberi is regarded by Manson as a 'place disease,' due to a toxin produced by a living germ operating in some culture medium outside the body. Of course, houses or rooms may, when once infected with the organisms of well-known diseases, retain them indefinitely, and thus be the means of originating similar affections after long intervals.

"6. Another most important aspect of infection, from

a practical point of view, is the fact that we are every one of us always carrying about in various parts of our bodies microbes, which while habitually innocuous and non-virulent, may under favoring conditions, so far as they are concerned, become extremely virulent, or possibly specific, to our personal undoing; or we may even be harboring in our mouths, throats, noses, ears, and thereabouts specific germs by which, quite unintentionally, we are liable to infect others at any time, while we ourselves go scot free. It is certain that very dangerous germs may lie dormant for an indefinite period in the human body, such as the bacilli of diphtheria, influenza, or tubercle, or their spores, and either lead to unexpected auto-infection, or to the corresponding specific disease in others. When suppuration is set up in any part of the body, moreover, it is wonderful how disagreeable the different organisms can be, in the way of migrating to various other structures, and producing a similar condition in connection with them.

"7. I must just refer, lastly, to the progress made in our knowledge of the channels of entrance of microbes into the system, and the modes in which they are disseminated. Here again the mouth, throat, and neighboring parts come into unpleasant prominence, especially the tonsils, in connection with scarlatina, rheumatic fever, tuberculosis, actinomycosis, and other diseases. The dissemination of the organisms by cells, the blood stream, and the lymphatic channels is also an important fact positively demonstrated; and in this dissemination embolism not uncommonly plays a conspicuous part.

"I now pass on to refer briefly to other modes of investigation not uncommonly of much diagnostic value in relation to infectious and infective diseases, which are also comparatively easily practised, and are supposed to be carried out more or less as a matter of routine in ordinary medical practice. I allude to physical examination, especially as applied to the chest and abdomen; and examination of the urine. Of course, in the clinical study of many inflammatory diseases and special affections now included under this category—for example, pneumonia or cardiac rheumatic manifestations—skilled physical examination is essential; while it is also of great help in the detection of complications and sequelæ, to which it must be noted attention may not be attracted by any prominent symptoms, and consequently they are very liable to be overlooked unless the practitioner is constantly on the alert to detect them by the systematic employment of this method of investigation. The necessity for examining the urine at frequent intervals would, I suppose, be generally recognized in scarlatina, or perhaps even in diphtheria, for well-known reasons; but this measure is not always carried out so regularly or systematically as it might be in other complaints of an infectious nature. As a special test applied to urine I may remind you of Ehrlich's 'diazo-reaction' for typhoid fever; but it is not reliable, even when present, as it may be met with in other affections.

"The special methods of diagnosis applicable to infective and infectious diseases which modern scientific researches have brought so prominently before the medical profession have naturally attracted great attention and excited keen interest. It might be thought an occasion like this would afford a most suitable opportunity for discussing these methods at some length, and endeavoring to estimate their practical advantage up to the present time and their future possibilities. I have preferred, however, to devote most of the time I could give to the clinical aspect of my subject to the more common modes of investigation, for reasons already sufficiently indicated. I have, therefore, left myself but

little space to deal with these more scientific methods, which I may remind you often require the help of an expert before their results can be safely relied on. I shall content myself with merely giving the following summary of these methods and their objects, mainly coming under the head of bacteriological diagnosis. They include:

"1. Examination of the blood, both as regards its normal constituents, especially the number of leucocytes and the relative proportion of different kinds of cells, the blood plates, and the presence of abnormal corpuscles; and from a bacteriological point of view. The spirillum of relapsing fever and the malarial parasites are prominent examples of pathogenic organisms found in the blood, and the latter have to be observed and studied during the changes they undergo; along with their effects upon the red corpuscles and the formation of pigment.

"2. The further detection and microscopical demonstration of organisms, specific or non-specific or both, either obtained from the tissues of the body; or contained in secretions, feces and urine, various discharges, sputum being particularly noteworthy, and other morbid products of different kinds, fluid or solid, of which diphtheritic material is a conspicuous example. The organisms are not only identified by their morphological characters, but also as a rule by their peculiar staining reactions.

"3. Separation or isolation of the microbes, which are afterwards grown on suitable media, in order to obtain cultures, the results being often highly characteristic, both to the naked eye and on microscopic examination.

"4. Application of the 'segregation' and 'agglutination' tests in relation to the blood serum of the patient, which is most familiar to us in Widal's test for enteric fever.

"5. The observation of the effects on the individual of the inoculation of certain products of the specific microbe of the disease from which he is supposed to be suffering, as in the so-called 'reaction test' with tuberculin for tuberculosis.

"6. The pathological results of inoculation of animals, either with the organisms themselves or with their toxins, which in some instances are essential for positive and accurate diagnosis, lesions of a definite and characteristic nature being thus produced, as is well-exemplified by diphtheria.

"A rather awkward question, but one of extreme practical importance to the profession, has been recently forced upon our notice, which I can not altogether pass by. In the British Medical Journal for March 7 an abstract is given of a disquieting statement issued by the Hospitals Committee of the Metropolitan Asylums Board as to the number of cases of mistaken diagnosis sent to the Board's hospitals as notifiable during the three years 1899-1901. The subject is very ably, fairly, and sensibly dealt with in a leading article in the British Medical Journal of March 14, on the 'Diagnosis of Notifiable Diseases,' which might be read with advantage by all who are directly interested in the question, or indeed even by the laity generally. They do not in the least realize the difficulties which confront the practitioner, with whom I have the deepest sympathy; and residents at the infectious hospitals can not be too careful and particular not to hurt the feelings of their brethren in the profession more than can be possibly helped. Of course any carelessness in diagnosis in relation to infectious diseases is inexcusable; but really young practitioners are not responsible for the fact that they are not so familiar with these complaints clinically as would be desirable, and that many of

them have to gain the requisite experience after they have entered upon their active professional duties. May I venture to suggest that while the modern medical student has immense advantages, he labors under a decided disadvantage from this point of view, as compared with those of us who served an apprenticeship, and became familiar with at any rate the more common infectious diseases, even before we started upon our regular studies at a medical school. As a matter of fact he gets very little opportunity of gaining practical knowledge of most of these complaints during his period of studentship, and has to fall back upon so-called 'post-graduate instruction,' if he desires further and more special training and experience."

Treatment.—Speaking of the advances in treatment he dwelt particularly on

1. *Hydrotherapy and Allied Methods.*—"No doubt you are aware that Dr. James Currie of Liverpool, to whom I have previously alluded, strongly advocated and carried out the treatment of fevers on a considerable scale by baths and douches. This treatment fell into practical desuetude, and, indeed, was generally looked upon with aversion and dread. In modern times, however, it has not only been revived, but numerous other methods for applying cold to the body, either generally or locally, have been added, not only by means of water, but also of ice and cold air. These methods are now generally recognized and extensively adopted, probably more on the Continent and in the United States than in this country, even in the treatment of many of the ordinary fevers, but especially in the more severe cases; and the local application of ice is strongly advocated in acute pneumonia and other inflammatory infective diseases. While of great value as antipyretics they have other important beneficial actions, which I need not now specify. Regarding hydrotherapy and allied measures in the treatment of infectious diseases, I would remark that every medical practitioner ought to be familiar with them, and be able and ready to carry them out when required. The milder methods, such as sponging the skin or applying ice locally, are easily practised, and are often of the greatest service. Personally, however, I do not advocate or employ the more severe methods as a routine system, as many do; and I feel sure that I have met with serious injurious consequences from such a practice. On the other hand, their essential value in saving life under grave conditions can not be too strongly insisted upon.

2. *Use of Alcohol.*—"I now come to a question in relation to the treatment of infectious diseases and cases, both generally and individually, which demands the most thoughtful consideration, namely, that of the administration of alcohol. And I feel bound to take this opportunity of stating emphatically that when we, as members of the medical profession, approach from any point of view this alcohol question, we ought to do so under a deep sense of responsibility, but at the same time rationally and without undue bias one way or the other. At a large political meeting held not very long ago an eminent statesman was contrasting imperial with local questions, and giving his own ideas about their relative importance, founded upon certain personal experiences. Amongst the local questions he mentioned 'temperance reforms,' and his allusion was received by the audience with loud laughter! I venture to say that such is not the spirit in which this grave subject ought to be regarded at the present day by any community; and, at any rate, the medical profession as a body is bound to sympathize with and encourage every effort made in this country to check the terrible evils produced by intemperance, which confront us in such overwhelming and appalling degree on all hands in our daily expe-

rience, and to do our utmost to promote sobriety amongst all classes, however hopeless the task may appear to be. And from this point of view we should always be most careful to avoid ordering stimulants to patients not accustomed to them, unless they are, in our individual opinion, really necessary; while it is well always to give very definite instructions as to their administration. There is an influential body of the medical faculty in this and other countries, some of them of the highest professional and scientific standing, who absolutely and entirely object to the use of alcohol under any circumstances, and for these ladies and gentlemen I entertain the highest respect. As you are probably aware, an 'International Medical Manifesto' against the use of alcoholic liquors was issued a short time ago, which roused resentment and a strong protest on the part of some members of our profession. To a certain extent I share their feelings, for, with all due respect to the opinions and statements expressed in that manifesto, I think those who signed it have gone too far, and I regret that I can not altogether agree with them. At any rate, so far as infectious diseases are concerned, I must express my own strong conviction that in a large number of cases the judicious administration of alcohol is of the greatest service, and I have seen a considerable number of grave, and sometimes almost hopeless cases in which I have no hesitation in affirming that recovery was due to the use of alcoholic stimulants, not uncommonly in considerable quantities. Moreover, they are often of conspicuous value during convalescence. With ordinary prudence and care it is quite easy to avoid establishing a habit of taking stimulants in the case of patients who have been previously abstainers. While thus expressing my personal opinion in favor of the use of these agents in infectious diseases under suitable circumstances, I feel bound, on the other hand, to warn against their employment as a matter of routine, and venture to urge that the most thoughtful and conscientious consideration should be given to every individual case before ordering them.

3. *External and Local Treatment.*—"The treatment of external or local manifestations of particular infectious diseases, such as scarlatina, smallpox, or diphtheria, affords legitimate ground for differences of opinion, and I must confess it is often puzzling to determine what is best to be done for such conditions when one reads the different methods of treatment advocated by different experienced authorities. I can not refer to them further now, and must content myself with saying that the measures to be adopted must be determined very much by the particular views of the practitioner, guided by judgment and discretion, and modified by the special circumstances of each case. Antiseptics and disinfectants are employed with great advantage as local applications for various purposes. How far the light treatment, the X-rays, or particular color rays are going to help us, can not be definitely determined at the present time. Just now the subject has come very prominently before the profession and the public, and the 'red-light treatment of smallpox,' which, however, is by no means a novelty, so strongly advocated by Professor Finsen in the *British Medical Journal* for June 6, is attracting special attention, as well as some adverse criticism. What we may expect, also, from that wonderful, newly discovered element—radium—it is impossible to foretell, but we must be on our guard against accepting statements as to its marvelous curative effects by irresponsible observers.

4. *Vaccines: Serumtherapy.*—"What would, no doubt, be generally regarded as the most vitally interesting and important question of modern times, bearing upon the prevention and treatment of the entire

group of infective diseases, is that of 'serumtherapy,' using the term as an inclusive one, which has come as the natural outcome of the microbic theory, and is founded, on the whole, on reliable bacteriological researches and experiments, supported by the results of practical experience in living subjects. Time will only permit me on the present occasion to touch the fringe of this most attractive and fascinating subject, and I will only ask you to bear with me while I remind you for a moment of what this method of treatment consists, and what are its objects and aims. Following Sims Woodhead's classification, the materials used are divided into—(1) Vaccines, which are either cultivations containing pathogenetic micro-organisms with toxins, or toxins only; or the tissues or fluids of an animal suffering from a particular infectious disease. (2) Antisera, which may be antitoxic only, neutralizing the toxins; antibacterial or antimicrobial, acting directly upon the organisms; or in some instances having both actions. The comparatively recent investigations of Professor Macfadyen and Mr. Sydney Rowland with regard to the immunizing power of the cell plasma of the typhoid bacillus, and the effects of repeated injections of this substance in rendering the blood serum of an animal both antitoxic and bactericidal, are very remarkable, and promise great results in the future. Up to the present time these therapeutic agents have been practically only employed by inoculation, being usually injected subcutaneously, but exceptionally more deeply, or into special structures. I note, however, that the antiphtheritic serum has lately been recommended to be administered by enema, or even in pastils. Vaccines and antisera are employed either for the purpose of producing temporary or permanent immunity against an individual disease; or for the actual treatment of certain complaints or morbid conditions, either acting as definite 'cures,' or so modifying their course that their severity and dangers are materially lessened, their progress is hastened, and their mortality greatly diminished. The large majority of these agents are specific, being only used in relation to a particular disease; but the antistreptococcus serum has been found of service in various affections, and so-called 'Coley's fluid' is also non-specific. The diseases thus treated with which we are most familiar are smallpox, as prevented or modified by vaccination and revaccination, hydrophobia, diphtheria, tetanus, enteric fever, scarlatina, cholera, pneumonia, septicemia, anthrax and glanders, plague, tuberculosis, leprosy, and cancerous or sarcomatous growths, assuming them to be infective. Now, no one who has watched the course of events during recent years, and who is unprejudiced, can doubt for a moment or fail to acknowledge the immense value of this modern therapeutic method in relation to some of these complaints; there are others, however, in which thus far it has entirely failed in its objects; while in others still it is on its trial, and those who are in a position to speak authoritatively differ widely in their views and conclusions as to its efficacy in some of the most important infectious diseases. Personally I confess that I am inclined to regard not a few of the positive statements made with a skeptical mind, and I think we ought to be particularly careful in accepting and acting upon them at the present time, remembering the suspicious and not too friendly attitude of a large number of the influential laity toward the medical profession. At the same time, it can not be too strongly insisted upon that every member of the medical profession ought to avail himself or herself to the full of any method of treatment which bacteriology offers us, provided it has been scientifically and practically proved and demonstrated to deserve our confidence. It is not for us, in the present

state of the law, to deal with the 'conscientious objector,' but I emphatically affirm that any individual practitioner who wilfully and with intent neglects or is in actual antagonism to vaccination and revaccination as a protection against smallpox, may be justly regarded as guilty of a grave dereliction of duty, and is responsible for serious mischief, the results of which are but too evident to any unprejudiced observer. The same remark certainly applies to the neglect of the vaccine or antitoxin treatment for diphtheria, hydrophobia, tetanus, and anthrax. The opening of the new building of the Jenner (now the Lister) Institute of Preventive Medicine encourages the hope that this country will not in the future be behind others in advancing this most important and promising branch of scientific and practical medicine.

"It was my original intention to offer some observations on the prevention of infectious diseases from a general standpoint, but I have already trespassed too long upon your patience, and must content myself with a few closing remarks. I venture to affirm that the predominant aim of the medical profession as a whole is essentially beneficent. In support of which statement I can confidently draw attention to the deep interest exhibited by its members in this question, and to the efforts made by them, not only to limit and prevent these complaints in a general way, but to eradicate and exterminate those with which we may be thus able to cope effectually. This is no sham or pretence on our part, but an honest and straightforward policy and purpose, to which not a few devote their lives and best efforts, which ought to be a rebuke to scoffers and slanderers, of whom there are many. I will go further, and say that in dealing with infectious diseases, medical practitioners and scientific workers often exhibit a brave, courageous, and self-sacrificing spirit, which is worthy of our highest esteem and admiration. To go into the midst of a virulent epidemic, and fight against it day and night, often under the most trying and adverse conditions, which is no uncommon experience, is no trifling matter; and I could give many instances of individual courage and devotion, as well as of voluntary exposure to grave personal danger, sometimes ending fatally, which were truly heroic. Even the bacteriological researches in laboratories, which are intended to benefit humanity, are a source of danger—witness the cases of fatal infection with tuberculosis, and the death of the young Austrian doctor who not long ago succumbed from plague while working in Berlin. But I feel bound to pay a special tribute of respect and admiration to those who have gone forth to pestilential climates, and often under great hardships, or even by submitting themselves to dangerous personal experiments, have done such marvelous work in diminishing and controlling, or in some districts even exterminating, malarial and other diseases which were formerly the cause of destruction of human life on a vast scale, as well as of such extensive and profound deterioration of health.

"What will be the future progress of events in relation to the prevention of infectious diseases it is impossible to foretell or estimate, though the forecast is in certain directions decidedly hopeful. I venture, however, to submit that we as a profession should be extremely cautious as to what we say, and should avoid a too 'cheery optimism,' in the way of making promises and predictions which, recognizing the very nature of things, the conditions under which humanity exists, and the difficulties which so-called civilization brings with it—experience and common-sense must tell us are, to say the least, extremely rash. On the other hand, let us never relax in our efforts to promote the good

cause, and to encourage, develop, and enforce every measure, scientific or practical, which has for its object the mitigation or prevention of those widespread and often terrible infectious diseases which now add so enormously to the death-rate, and which, even in cases of recovery, leave such serious after-consequences amongst large numbers of the community. And this we must do in spite of opposition, however powerful, persistent calumny, vicious attacks on our motives, or even being called foul names. There are numerous 'antis' about just now, but for downright insolence and impudence the antivivisectionists 'hold the field.' They have the most astounding faculty and capacity for fabricating statements for which there is absolutely no foundation, for distorting facts, and for cooking statistics, and they stick at nothing. Let us treat them and their hysterical outbursts with the contempt they deserve. Our duty is plain enough. Not only must we work on steadily as a profession in the direction I have indicated, but we must earnestly strive to gain the confidence and cooperation of influential individuals and communities, and to guide them on intelligent and rational lines.

"I have been asked to speak in this address in support of the appointment of a Minister of Public Health. I note that you, Mr. President, are not in favor of such an appointment; but personally I really do not feel competent to speak one way or the other. You have sketched a scheme with regard to the practical and official working of the Public Health Department which appears to have sound principles underlying it; and at any rate some change is obviously necessary. In the meantime, however, we must do what we can to educate and influence borough and county councils, and other public bodies which are concerned with sanitary matters, as well as members of both Houses of Parliament and to stimulate them to do their duty. Thus will we, as members of a self-sacrificing and noble calling, while endeavoring in our individual capacity to perform conscientiously and intelligently the duties which devolve upon us in relation to actual cases of infectious diseases which come before us in our several spheres of practice, be further collectively and with concerted action doing what lies in our power to promote the health and well-being of our fellow creatures on a large and comprehensive scale, and to avert or mitigate the effects of those grave maladies which are now such a scourge to humanity."

Evolution of Abdominal Surgery.—Dr. A. W. Mayo Robson, of London, gave the address in Surgery, basing his remarks on his observations extending over a third of a century and his experience in 2,000 operations. He said:

"It is clearly impossible in a short time even to briefly record all the advances made in surgery, but in my work as a general surgeon I have also had the privilege of taking part in the development and progress of a special branch, abdominal surgery, than which nothing could better exemplify the great changes that have occurred during the thirty-three years which I am considering; for, in the early Seventies, abdominal diseases were practically always treated expectantly, and if we look at the reports of 1870 we shall see that, as judged by results, it was perhaps just as well that surgery had then no business inside the abdomen.

"As knowledge increased, and surgery became more scientific, many of the diseases in question became surgical either from the beginning or at a later period in their course, so that to-day abdominal surgery is a subject of the first importance. Not only has treatment advanced by leaps and bounds, but our knowledge of abdominal diseases and their successful diagnosis has

enormously increased, partly by pathological advancement generally and by experimental research, but also by philosophical observations on the operating table and the study of disease in the living subject—in other words through biopsy instead of necropsy. The time was when the physician thought he had done all that was necessary when he had arrived at a probable diagnosis, and he philosophically waited until his hypotheses were proved or disproved in the deadhouse; treatment was left to the junior as being quite a secondary matter, and I am bound to say that in abdominal diseases that were not merely functional, and that could not be treated in the out-patient department, the estimate placed on treatment was often correct.

"Then ovarian disease was generally known as a form of dropsy, and was either treated by tapping, when the pressure became so severe as to demand some relief, or seeing that tapping was at times fatal or only gave a temporary respite, the greater number of cases went untreated. The surgery of the intestines, except for strangulated hernia, was not thought of, and uterine, renal, gall-bladder, stomach, liver, and pancreatic surgery were hardly dreamt of as possible. In 1870 an attempt was being made in some of the general hospitals to emulate the example set by certain pioneers, such as Clay, of Manchester, Spencer Wells, of London, and Keith, of Edinburgh, but with what result? It is interesting to note the following facts:

"In St. Bartholomew's in 1870 there were 3 ovariectomies, all fatal, and 20 cases of herniotomy in which the sac was opened, with 9 deaths. In Guy's there were 5 ovariectomies with 3 deaths, and 19 herniotomies with opening of the sac, of which 11 died. In St. Thomas's there was 1 ovariectomy, which died, and there were 14 herniotomies, of which 8 died. In St. George's there were 2 ovariectomies, both of which died, 1 colotomy, which died, and 20 herniotomies, of which 8 died.

"In the same reports there was always found a special record of the number of cases which are now so rarely seen. For instance, in one of the reports for 1870 there were recorded 53 cases of erysipelas, 20 of phagedena, 93 of diffuse cellulitis, and 4 cases of secondary hemorrhage after operation, which at the present time would be sufficient to condemn any surgical clinic; yet this record was no exception, as all the hospitals furnished similar reports.

"It would be invidious to compare the work of the various hospitals, as shown by the reports of 1902 published this year, but in one of the chief hospitals I notice a record of 40 ovariectomies with 39 recoveries, of 18 hysterectomies with 17 recoveries, of 241 herniotomies including strangulated hernia as well as radical cure of the hernia, with 233 recoveries, of 16 gall-bladder operations with 15 recoveries, a record of which no hospital in the world need feel ashamed.

"The rise and progress of abdominal surgery has centered more around ovariectomy than any other branch of work, hence it may be of interest to review for a moment the evolution of that operation, for it has been the battlefield of abdominal work.

"The history of ovariectomy is one of international importance, for the performance of the first operation has been claimed both by Great Britain and America. Williams, of Basle, in 1731 seems to have recognized the possibility of ovariectomy, and Hunter in 1762, with characteristic genius, actually suggested the modern operation, urging a small incision, the tapping of the cyst, removing it and ligaturing the pedicle. Houston, of Glasgow, operated for ovarian tumor before McDowell, but according to the best authorities McDowell, of Kentucky, performed the first complete and successful ovariectomy in December, 1809. Both in America

and Great Britain the operation struggled into existence in the provinces before it engaged the attention of surgeons in the great medical centers, and in 1825 Liston boasted that Lizars (who had done several not very successful operations in Edinburgh) did not set about any such operations in the infirmary after he became attached to it. The medical papers of that day also condemned it absolutely.

"Although Clay, of Manchester, between 1842 and 1850 had chronicled 33 operations with 21 successes, a 36.3 per cent. mortality, and Spencer Wells in his work up to 1870 showed a mortality of 25 to 30 per cent., yet in that year, in the large general hospitals, the mortality was no less than 81 per cent. I distinctly recollect as a student the question being raised as to whether ovariectomy ought to be continued, and I remember as a dresser that the easiest cases, where there was a healthy peritoneum free from adhesions, were almost certain to die.

"From 1870 I followed keenly all the controversies on the subject, and a little later took the opportunity as a post-graduate of visiting Keith in Edinburgh, Spencer Wells in London, and some years later Lawson Tait in Birmingham, from all of whom I learned valuable lessons. Keith, a thorough believer in antiseptic procedures, in 1884 published a series of cases with a 9.11 per cent. mortality, but later he had 80 consecutive recoveries in completed cases, while Tait published an account of 405 cases with 33 deaths, an 8.1 per cent. mortality, and in 1885 he had had 139 cases without a death.

"The success in private practice and in the smaller hospitals was so much greater than in the general hospitals that the question was raised as to whether such operations ought ever to be performed in a general clinic. Yet what do we see to-day—last year there were 67 ovariectomies including malignant and suppurating cases performed in the Leeds General Infirmary (with which until recently I was actively associated) with only 3 deaths, otherwise a mortality of 4.4 per cent., which I find to be about the average in general hospitals; for although in private practice, where operations are performed at an earlier stage and in patients not worn down by suffering and hard work up to the last moment, better results may be shown, yet it may now generally be fairly stated to any patient suffering from ovarian cyst that her chances of recovery are fully 95 out of the 100, for excluding accidents such as syncope, embolism, and pneumonia, which are often unavoidable, there is no reason why any patient should die after an ordinary ovariectomy skilfully performed.

"It is interesting to note the changes that have brought about these results. I remember in the early Seventies, when there was no special preparation of ligatures, which were of silk used straight out to the storage cabinet, and often handed to the surgeon by the theater porter, who might even be post mortem attendant; when little care was spent on cleansing the surgeon's hands and none on cleaning the patient's skin; when a perfunctory washing was supposed to be sufficient for instruments, and a very superficial cleansing to be ample for sponges, which were doubtless the most fertile source of mischief. The surgeon then wore a non-washable operating coat to protect his own clothes from being soiled, and not, as now, a sterilized overall to guard his patient from contamination.

"The introduction of antiseptics started the change, but at first and for some years, carbolic acid was by many thought to act like a fetish, and to cover a multitude of sins; a mere dipping of the hands in a 1-in-20-to-40 solution was considered a means of cleansing, the soaking of catgut ligatures in carbolic oil was

thought to be a sufficient preparation, and the skin of the patient was for a long time ignored as a source of infection. Moreover, the improper use of the carbolic spray, which was allowed to play straight into the opened abdomen, was itself a source of danger, undoubtedly causing many deaths, though it was not dangerous when properly employed, as, for instance, by the late Thomas Keith, who, while using antiseptics, including the spray, yet took every care to cleanse his hands and instruments and the patient's skin; and in this way, so early as 1884, was able to record such good work. In the Eighties, following on the same lines, I was able to report my first series of 83 cases in a general hospital with 4 deaths, only two of which could be referred to as wound complications, though later I had a consecutive series of 103 cases in private, with only one death, and that patient was operated on when suffering from acute peritonitis.

"Then came a reaction against the use of antiseptics, and a veritable crusade, with much acrimonious writing, was led off by Lawson Tait, who argued that antiseptics were not only unnecessary to success, but were actually injurious. By Dr. Bantock, who held similar views, sepsis was carried out quite early; and I remember, when seeing him operate at the Samaritan Hospital, the infinite care he took in cleansing his hands and everything that came in contact with the wound; but in the late Lawson Tait's case his success came from another discovery, for, although he was by no means what we should now call an aseptic surgeon, as shown by his results in other than abdominal wounds, his genius found a different way, for he taught us the value of natural drainage through the intestines, and the importance of the avoidance of morphia. He made a routine practice of purging after operation, and so avoided that distention which used to kill so rapidly in early ovarian work. Had purging and the avoidance of morphia been adopted in the early Seventies I have no doubt that the large mortality of that day would have been materially lessened. Over and over again as a student I have seen patients killed by intestinal paralysis induced through morphia, who, I now know, might have been saved by a dose of calomel and Epsom salts. Other lessons I learnt from Lawson Tait were the value of rapidity in operating and of thoroughness in the removal of disease, for in early work on the uterine appendages it was not at all uncommon for the surgeon to be deterred by adhesions, and to rest satisfied with the drainage of pus tubes and cysts, instead of their complete removal, with the result that such patients either remained invalids or died more rapidly than if they had never been treated. I followed the evolution of the treatment of the ovarian pedicle by means of the external clamp (Wells), the cautery (T. Keith), the *écraseur* (Jessop), and lastly, by ligature with dropping of the pedicle, which we all now adopt, and which Baker Brown was the first to advocate.

"Under perfected technic, and a judicious combination of asepsis and antiseptics, ovariectomy has become one of the most successful major operations in surgery, and has paved the way for other equally great triumphs within the abdomen.

"The discovery of the frequency of perforative appendicitis, of perforating gastric ulcer, and of other peritoneal catastrophes is gradually abolishing the term acute peritonitis for the more rational one of acute peritoneal infection, for the treatment of which surgery alone is of any use, and even for it to be of service operation must not be long delayed.

"These more rational views of pathology and treatment have originated and developed with recent years, and I can recall case after case, during my student days,

in which peritoneal catastrophes ended fatally, where now we should by timely interference give a very fair chance of life. Could anything show this more definitely than the results of treatment of perforated gastric ulcers, which if operated on at once would have hardly any mortality, if within 12 hours of rupture have a mortality of 16.6 per cent., if within 24 hours, 63.6 per cent., if within 36 hours, 87.5 per cent., and if delayed for 48 hours will only rarely succeed; or to give another example, than the results of surgical treatment of the intestine in typhoid fever, alas too seldom resorted to. To give an example kindly obtained for me by Dr. P. J. Cammidge: Out of a total number of 900 cases of typhoid fever occurring in St. Bartholomew's Hospital in the years 1895 to 1901 there were 102 deaths. Among the 900 cases were 38 of perforation, of which 34 died unoperated on, whereas of the 4 operated on 3 recovered. Could operation have been done in the remaining cases it would seem possible that 25 more lives might have been saved. In Professor Osler's clinic, out of 11 cases 5 were saved by operation. Intimately related to intestinal perforation is perforation of the gall-bladder in typhoid fever, of which 34 cases have been collected by Dr. Erdmann, of New York; of these 27 were not operated on and all died, but of the 7 which were operated on 4 recovered.

"As spontaneous recovery from perforation is extremely rare it is of the utmost importance that not only should we have an early recognition of the perforation, but also an immediate operation.

"Up to 1883 every case of intraperitoneal rupture of the bladder had died, but in that year the late Sir William MacCormac operated on and saved two lives; since that time there have been 54 operations recorded (according to Dr. Jones, *Annals of Surgery*, June, 1903), out of which 28 recovered, could these cases have been seen earlier, the saving of life would have been much greater, for in the cases that recovered there had only been an average interval of 25¼ hours between the accident and the operation, whereas in the cases that died the average interval had been 32 hours, and of the 26 deaths, 17 were due to peritoneal infection. Just as in gastric ulcer, the danger is increased with every hour of delay between the accident and operation; hence in case of doubt, exploration (which can be done through a very small incision, just sufficient to admit the finger) is safer than waiting, and experience shows that the aiding of the diagnosis by the injection of air or fluid into the bladder adds to the risk of general peritonitis by spreading infection over the whole abdomen.

"In injuries of the abdomen by penetrating wound, whether stab or bullet wounds, the resulting troubles are from infection, either directly through the instrument causing the injury or by perforation of one of the hollow viscera and escape into the peritoneal cavity of the septic contents; how much more rational it is to consider this as an infection and immediately to set about the removal of the poison and the repair of the damage, if it can be done under conditions favorable to success, than to treat it as peritonitis and rely on so-called antiphlogistic remedies. Few greater triumphs of scientific surgery can be shown than some of the remarkable cases of visceral injury, where stomach, bowel, liver, gall-bladder, and other viscera have been perforated, either by bullet or some other sharp instrument, and in which operation has been successfully performed, before infection has had time to occur.

"Appendicitis of the acute, perforating, or gangrenous type comes on so suddenly as often to constitute a peritoneal catastrophe, and in a proportion of cases terminates fatally in so rapid a manner that the diagnosis is made only with great difficulty, or not at all.

Such cases, when I was a student, went undiagnosed, and death was ascribed to peritonitis simply, a sufficient diagnosis in those days; and it was not till 1886 that we heard anything of this lethal malady, which though it has slain its tens of thousands is now, thanks mainly to the labors of Fitz, of Boston, who laid the foundation of our modern knowledge of the subject, brought under subjection in a very large percentage of cases.

"The disease is said to be on the increase, but I am not at all clear as to the truth of this, as there have been buried in our literary records for generations, fairly accurate accounts of dangerous inflammations occurring in the right iliac fossa and described vaguely as typhilitis, perityphilitis, paratyphilitis, etc., and both Copland and Burne in 1837 gave accurate descriptions of perforative appendicitis and its consequences.

Hysterectomy for Myoma.—"Although hysterectomy was unsuccessfully done by Heath in 1843, and successfully performed by Burnham in 1853, yet surgical progress was so slow that in 1883 a series of cases collected by Bigelow gave a mortality of 42 per cent., which was enough to condemn the operation, had it not been that Thomas Keith at that very time was doing brilliant work on the most serious cases, and establishing the operation on a sound basis. His mortality was 8 per cent., according to the late Greig Smith, who was himself operating with great success—barely a 5-per cent. mortality. My own experience has been in 170 cases of operations for myoma, with a 5.2 per cent. mortality, this including all the earlier as well as the later operations, and including cases treated by the *serre-nocud* and by enucleation as well as by the more modern treatment of the pedicle and by panhysterectomy. The evolution of the operation of hysterectomy has been most interesting; just as the external treatment of the pedicle in ovariectomy gave the best results at first, so in hysterectomy the treatment by Koeberle's *serre-nocud* rendered the operation a justifiable one, and Dr. Bantock, Mr. Thornton, Lawson Tait, and others had considerable success by this means; but the difficulty of keeping the pedicle dry, the prolonged convalescence, and the subsequent liability to hernia led some surgeons to be discontented with it; yet I distinctly remember years ago when advocating the internal treatment of the pedicle at one of the societies, how some operators were very tardy to acknowledge the advantages of the operation introduced by Schroeder, and well on in the Nineties Greig Smith condemned it, stating that the mortality was double that of the extra-peritoneal method. The latest statistics have been furnished by Mr. C. Bond, of Leicester, who recently reported 50 cases with 2 deaths—an excellent record.

Biliary Surgery.—"The surgery of the bile passages is one of the most interesting episodes in abdominal work, for although the first cholecystotomy was performed so far back as 1867 by Bobbs, of Indianapolis, it is only within recent years that surgery has come to be recognized as the treatment for gall-stones. I performed my first cholecystotomy in 1885, since which time I have operated nearly 600 times on the gall-bladder and bile ducts. When in 1889 I read a paper before the London Clinical Society, one of the leading London surgeons said to me, 'Wherever do you conjure your gall-bladder cases from; we never see them here?' I referred him to the medical wards and to the post-mortem room of any of the hospitals, with the result that within a short time he found many cases requiring relief. At first cholecystotomy only was practised, with the result that the ducts were often left obstructed and fistula necessarily followed. It was thought to be a bold venture when Lawson Tait crushed a stone in the common duct, a procedure which I followed with

success on a number of occasions, until Courvoisier in 1891 showed it to be better to directly incise the common duct. Common-duct operations, as performed by the upward incision and rotation of the liver, which I introduced some time ago, are now as easy as an ordinary cholecystotomy used to be, for the improved method enables the whole of the biliary ducts to be brought near to the surface, and to be deliberately dealt with. Nothing could demonstrate this better than the results in my own practice in an experience of over 100 choledochotomies, for whereas in my first series before 1900 the rate of mortality was 23.8 per cent. in my last series it is only 1.5 per cent., and I have had a continuous series of 50 cases without a death; moreover, it must be borne in mind that nearly every one of these cases is not merely a successful operation but a life saved, for common-duct cholelithiasis associated with infective or suppurative cholangitis and deep jaundice is a mortal malady.

"Fortunately, gall-stones are usually easily diagnosed, the symptoms are classic and in the early stages before complications have supervened, cholelithiasis is curable by surgical methods in 99 per cent. of cases, as I myself have demonstrated in a large series of operations; but if we wait for complications to supervene, and for the onset of jaundice and various infections, or until cancer has invaded the liver and gall-bladder, which it does ultimately in 50 per cent. of cases in which jaundice is present, then there will be a very different tale to tell.

"Even yet we do not get these cases always in time, and until the fact is grasped that medicine can, as a rule, only relieve and cannot cure cholelithiasis we shall be continually having to operate in the presence of serious complications, endangering life, when operation is five to ten times more dangerous than if it had been undertaken at an earlier stage.

"The great reduction in mortality in gall-bladder surgery is due to an earlier diagnosis, a closer study of the pathogeny of the disease, and infinitely greater care in operative technique. Much work remains to be done in this region, for it is a difficult and complex field, less accessible than many other regions of the abdomen, and often complicated by pancreatic trouble coexisting; but progress is steadily being made, and every year shows real advance tending towards perfection.

Surgery of Liver.—"The surgery of the liver was until recent years limited to the evacuation of abscesses and hydatids, and it is interesting to note the evolution of the various methods following closely one on the other; of emptying by trochar or aspirator; of opening by caustic or thermocautery; of incision *à deux temps*; and, lastly, of the method which we now generally adopt—hepatotomy, or direct incision of the organ after reaching the liver, either through the abdominal parietes, or, if necessary, through the thoracic wall—an operation the credit of which must be given to Lawson Tait, who published a first series of 10 cases between 1873 and 1882, all successful. Mr. Bryant, Mr. Knowsley Thornton, Mr. Godlee, myself, and others followed on the same lines. As showing the extent of this field of work I have operated directly on the liver for one disease or another nearly 100 times, this being exclusive of cases of jaundice dependent on gall-stones or pancreatic disease, for which I have operated on many more occasions.

"At first sight it would seem impracticable to remove a tumor of the liver but experience shows that although the liver tissue is friable and the capsule thin and not easily sutured, the bleeding is readily arrested by pressure, and it is possible to remove both simple and malignant tumors if localized and not too extensive.

Out of 9 operations for partial hepatectomy that I have performed, 8 have recovered, and in 2 cases where I removed a cancer of the gall-bladder and liver, the disease being proved microscopically, the patients are now in perfect health four years and three years respectively after operation.

"Dr. Keen, of Philadelphia, collected 20 cases of partial hepatectomy with only 2 deaths, and others have been performed since with equal success, so that the operation is one of real practical utility.

Stomach Surgery.—"The surgery of the stomach is still more recent than that of the gall-bladder, but unlike gall-bladder work, which was successful from the outset, the way to success in gastric operations has been paved with many failures, and only recently has the surgeon been able to show what can be done in this branch of the work. For instance, when gastrotomy was first performed by Sedillot and by those who followed him, it was nearly always fatal, the chief reason being that the patients were never handed over to the surgeon until nearly moribund; of such were my first 8 cases, of which 6 died; even up to 1890 the mortality was so great that the operation was seldom advised, yet it can now be done in so short a time and with so little disturbance that out of my last 24 cases all have recovered except 1, leading to considerable prolongation of life in the malignant and to saving of life in the simple cases. In the Seventies, any one with carcinoma of the stomach was at once given up as hopeless, and only in 1879 was the first attempt made by Péan to remove a malignant pylorus, the first successful operation being performed by Billroth in 1881, when the operation was looked on with as much disfavor as was the first attempted complete gastrectomy a few years ago by Connor in America, yet Schlatter's patient a little later lived fourteen months after complete gastrectomy, and I can point to a man in good health on whom I performed almost complete excision of the stomach two and a-half years ago, and to others now well who have had partial gastrectomy done. Professor Kocher's statistics in this branch of work are of great importance as showing that the radical operation may in some cases, if done thoroughly, prove curative.

Gastric Ulcer.—"Until quite recently gastric ulcer, except for one or two of its complications, has been considered to be a subject for medical treatment from first to last. The profession is, however, becoming awakened to the fact that it is not the trifling ailment it was once considered to be, and that it should from the first be taken seriously, for it is in the early stages that medical treatment can be employed to the best advantage, and in the later stages that general treatment is so often followed by relapse or by serious complications.

"Leube, one of the greatest medical authorities on the subject says that one-half or three-fourths of all cases will be cured by four or five weeks of treatment, but, if not better in that time, they will never be cured by medical treatment alone; and Einhorn says it is fatal directly and indirectly in 50 per cent. of cases when reliance is placed exclusively on medical treatment. It can be demonstrated that in the patients incurable by medical means surgery holds out a good hope of relief or cure in 95 per cent. of cases, as I have shown in an address recently given before the London Polyclinic. The subject is too large to enter minutely into, but from what I have stated now, and in other places have given in detail, it will be seen that in this as in other diseases of the stomach, modern surgery has very great triumphs to record.

Pancreatitis.—"The pancreas had practically received no attention from a surgical point of view up to Senn's classical experimental work in 1886, and even

for some time after that the only interest centered around cysts, so that Greig Smith, writing in 1896, said, "The experience of the last ten years has added little to the work of Senn of Chicago." But what do we see to-day? That the subject is of such magnitude as to need a volume of considerable size to adequately deal with its pathology and surgical treatment. I myself have operated on nearly a hundred cases of diseases of the pancreas of various kinds. Acute pancreatitis is one of the most serious and fatal of diseases, often coming on with startling suddenness, and it is astonishing how it can have escaped the notice of pathologists until so recently. Fortunately surgery has been able to interfere beneficially in some of these cases, especially those ending in suppuration, and as our knowledge of the subject increases we shall be able to do more both in the way of prevention and cure. Chronic pancreatitis, though recognized from a pathological point of view, was practically unrecognized as a subject for surgical treatment until I drew attention in June, 1900, to the facts derived from an experience extending over some years, that many cases described as cancer of the head of the pancreas and leading to chronic jaundice, which ended fatally, were really cases of chronic pancreatitis that could be cured by draining the pancreatic duct indirectly through the bile passages; this has led to great success in the treatment of a class of cases previously treated as hopeless. The treatment of cysts is most successful, and it is now well established that in drainage we may reasonably expect to cure or materially relieve in a very large proportion (probably 93 to 95 per cent.) of cases.

Tuberculous Disease.—"The advances in the pathology and treatment of phthisis since the discovery of the tubercle bacillus have become public knowledge, but I do not think it is quite realized how enormous the saving of life has been; for, while in 1838, 38 persons in 10,000 died of phthisis, the proportion is now but 13 in 10,000. Now can we show anything like this in surgical tuberculosis? I think we can, since preventive medicine of course applies equally here; and there can be no doubt that the early recognition of joint and bone disease has led to more rational therapeutics and a great saving of life and limb. To-day, however, I need only consider tuberculosis as it concerns the abdomen; and just as we saw that so-called acute peritonitis may be better described as an acute peritoneal infection, so, in the case of chronic tuberculous peritonitis, we should do better to term it tuberculous infection of the peritoneum, for it is generally a secondary infection; and frequently, as can be proved from actual cases, may be treated in an early stage by removal of the cause, whether that be a tuberculous appendix, a tuberculous pyosalpinx or ovary, a tuberculous mass of intestine or mesenteric glands.

"Although Spencer Wells some years previously, accidentally discovered that an extensive abdominal tuberculosis was cured by drainage of the peritoneum, it was not until 1884 that Koenig (*Centralblatt für Chirurgie*, 1884 and 1890) planned the operation which has had such good results, and has led to so many successes.

"What we must do in the future is to prevent these diseases if we can, by avoiding the distribution of tubercle bacilli in the air and in our food; or failing that, we must if possible catch cases at an earlier stage, and remove the primary focus, so as to prevent the general invasion of the peritoneum to which I have just referred. If, however, we are only consulted when the disease is so far advanced that medical treatment can do no more good, drainage of the abdomen by a simple and short operation may bring about recovery in a remark-

able manner, and I have seen patients reduced to the last extremity of weakness, where the mesentery was standing stiff with tubercle, and the abdomen was swollen to an enormous size, to recover completely and be thoroughly restored to perfect health from a condition apparently completely hopeless.

"The Surgery of the Intestines provides the most varied and difficult field of work in the abdomen, and as the ordinary methods adopted in general surgery here need modification, the evolution of intestinal surgery has been accompanied by infinite variety in detail.

"The interrupted suture at first employed occupied so much time in application that many modifications were soon introduced, and in 1885 Mr. Bishop showed there were no fewer than thirty-three distinct methods of enterorrhaphy, and since probably as many more have been introduced.

"In 1887, Senn's plates were employed to facilitate the process of intestinal anastomosis, and I remember what a great impetus was given to the surgery of the intestinal canal by Dr. Senn's very able paper and demonstration at the International Medical Congress in Copenhagen. In 1892, being dissatisfied with the methods then in vogue, I invented a decalcified bone bobbin shaped like a cotton reel, which would form a temporary splint around which to apply two continuous sutures, one to the serous and another to the mucous margin of the new openings; which method has proved most useful, and I feel sure has ministered to whatever success I have had in this line of work.

"In 1892 Dr. Murphy, of Chicago, invented his well-known metal button, which, since it is employed without previous application of sutures, can be used very quickly, and by its distinguished inventor as well as in the hands of other surgeons it has been adopted with great success. The chief disadvantages it presents are (1) that it is necessarily associated with sloughing of the compressed and coapted ends of the bowel; (2) that a foreign body is left in the canal which sometimes produces ulceration and other troubles; and (3) that the opening has been found in some cases to contract and necessitate a further operation.

"It is astonishing what large portions of the intestinal tract may be taken away with safety; for instance, Mr. Barker removed 5½ ft. of damaged bowel with success in a case of strangulated gangrenous hernia, and I have on several occasions removed part of the ileum, the cecum, the ascending and part of the transverse colon with recovery of the patient.

"In the first number of the International Archives of Surgery is the description of a case in which Dr. Roswell Park removed 8 ft. 9 in. of gangrenous small intestine, the patient being well a year later; and in the same paper reference is made to 17 other cases in which over 6 ft. of bowel had been excised with recovery in 14; in one of these cases no less than 11 ft. were removed.

"In 1884 colotomy had the enormous mortality of 31.6 per cent. for the lumbar and 53.1 per cent. for the inguinal operation, as shown by Dr. W. R. Batt, who collected the records of 351 cases; in 1889, under improved technic, the inguinal operation was reintroduced by Mr. Allingham, with the result that the mortality was diminished in a short time to under 10 per cent., even including cases of acute obstruction, though excluding the acute cases the mortality is under 5 per cent. Looking to the future, it seems highly probable that colotomy will be largely replaced by the removal of the disease, for it has been clearly proved that there is no part of the lower bowel which cannot be safely excised if taken sufficiently early, and I can point to a number of patients living in comfort from whom I re-

moved rectal cancer years ago; in one the patient being in good health ten years after. Mr. Watson Cheyne estimates the mortality of excision of the rectum at from 5 to 10 per cent., and refers to Kocher's statistics in which 28 per cent. of cases remained well from three to sixteen years after proctectomy.

"For the rational treatment of intestinal obstruction we owe much, first to the anatomical researches of Sir Frederick Treves, and secondly to his admirable work on the pathology and surgery of the subject.

"At the present day the differential diagnosis has been so well worked out, and the technic of operative work so much improved, that no physician or surgeon long delays resorting to operation if relief be not soon obtained, and the results as shown by numerous reports, amply justify the change.

Hernia.—"When I was a student much time was spent and great expense incurred both by patients and hospitals in the fitting of trusses to enable those crippled by rupture to go about with any degree of safety or comfort and many of those patients ultimately lost their lives through strangulated hernia, the operation for which at one time as shown by Mr. Barker, had the huge mortality of 53.1 per cent., and even yet, according to that surgeon, has in hospital practice the high rate of 22.2 per cent. My own experience does not bear out this high mortality, though I find it, as one would expect, to vary in hospitals and in private patients. Taking all my cases of strangulated hernia from 1880 to 1903, both in hospital and in private, the mortality has been 13.5 per cent., but while the private cases, for the most part operated on without loss of time, show only a mortality of 5 per cent. since 1890, the hospital cases seen at a later stage, show the all-round mortality of 14.2 per cent., and I thoroughly agree with Mr. Barker that cases seen when the bowel has become seriously changed will stand a much better chance of recovery if the damaged gut is removed by a free enterectomy of the proximal end.

"What we want, however, to impress on the public, is to have the radical cure performed early, when it is practically devoid of risk, as shown by the following statistics. In the Johns Hopkins Hospital there was only 1 death in 459 operations. In Carle's clinic in Rome, 2 deaths in 1,400 operations, in the Vienna clinic 3 in 804, and in Dr. W. B. Coley's 1,075 cases only 2 deaths, all of which when massed together give a mortality of about one-fifth per cent. But where the radical cure has not been done and strangulation unfortunately occurs, it ought to be more fully grasped that no time should be lost in taxis, but that operation should be performed without delay, when it can be done with a risk of not more than 5 per cent. and radical cure can at the same time be performed.

"Ectopic Gestation until recently constituted a dark chapter in medicine; it was altogether misunderstood both as to cause, pathology, symptoms, and treatment, and hundreds of lives were lost annually which are now saved by timely surgical intervention. To the genius of Lawson Tait, who utilized the post-mortem experience of Bernutz and Goupil published in 1886, and the clinical observations of J. S. Parry, we owe the successful treatment of this otherwise fatal disease. His work on this subject alone should be sufficient to establish a claim for him to be placed among the great benefactors of science and of humanity.

"As showing the success of his treatment from the first, up to 1887 he had operated 35 times for ruptured tubal pregnancy with only 2 deaths, and in my valedictory address at the termination of office as President of the British Gynecological Society in 1898 I was able to report, following on the same lines, 23 operations

for ectopic gestation with 1 death. The subject has received much attention at the hands of Professor J. W. Taylor, of Birmingham, Mr. Bland-Sutton, and others, but only recently has it been distinctly proved by 4 undoubted cases, 1 of which came under my care, that ovarian gestation is a possibility.

The Surgery of the Kidneys and Ureters.—"Although the dawn of renal surgery dates from August 2, 1869, when Simon of Heidelberg deliberately performed nephrectomy, the first successful operation in England was done by a member of your Council, my respected colleague, Mr. T. R. Jessop, an operation which I had the privilege of witnessing. Sir Thomas Smith advocated nephrotomy in 1869 before Simon's operation, but it was not until 1870 that Mr. Bryant first performed the operation and until 1880 that Mr. Henry Morris applied it to the removal of a calculus. As showing the advances that followed, the last named surgeon was in 1898 able to report 34 nephro-lithotomies with 33 recoveries, showing the invalidity of the objection which had before 1880 been urged against the proposal to operate on a kidney not already converted into a mere abscess sac; and proving that the conservation of the kidney by removal of the disease was infinitely better than the sacrifice of the organ, which was at one time advocated. The next advance was due to Hahn, who in 1881 described two cases in which he had performed the operation of nephropexy for the fixation of movable kidney, a procedure which in proper cases confers great benefit on a class of patients who previously had to bear their troubles until the movable organs were often converted into large fluid cysts owing to intermittent kinking of the ureters. By utilizing the partly stripped capsule and the posterior incision of Edebohls, I have been gratified with the results, both immediate and remote, of the operation, which with little or no risk, in properly selected cases, has been the means of restoring many invalids to a state of health and comfort.

The most recent advance in renal surgery has been in the treatment of chronic nephritis of Bright's disease, which was first drawn attention to by my friend Mr. Reginald Harrison, who recommended the renal puncture or incision in certain cases of chronic albuminuria; but to Dr. Edebohls, of New York, must be given the credit of adopting an original operation for the treatment of Bright's disease. He in 1898 deliberately exposed both kidneys, stripped their capsule, and fixed them in position, in a young woman of twenty-six. Frequent examinations during the five years showed in every instance normal conditions, and the patient has recently married and is well. In March of this year Dr. Edebohls reported 51 cases of renal decapsulation, and in 47 of these cases both kidneys were operated on at the same time. Out of this large number, 22 are said to be improving from three to fifteen months after operation.

"As yet it is too early to pronounce a definite opinion on the procedure, but it is an undoubted fact that recapsulation does effect some improvement in this serious malady, and it may possibly prove effectual in saving life in those terrible cases where suppression of urine comes on after some trifling operation, such as catheterism, or after a chill, or in scarlatina; just as surgery has effectually stepped in and saved life where suppression was due to obstruction of both ureters. We may certainly go so far as to say that no patient ought to be allowed to die from suppression of urine without the surgical question being considered.

Immunity.—"In future it seems assured that many of those infections will be dealt with by the method of immunization; and it seems not at all improbable that, even if such diseases cannot be prevented, the necessity

for operation may in some be staved off, while in others the operative results may be materially improved, and the postoperative anxieties lessened by protective inoculation before operation.

"Of the treatment of streptococcus infection, such as erysipelas and other diffuse inflammations, by the antistreptococcus serum we can probably all point to some excellent as well as to other uncertain results; but as improvement in the preparation of the antitoxin occurs, and as our knowledge of when and how to use it is increased, we shall be able to calculate on more certain results. At the present time surgeons are finding the injection of the serum of service in immunizing before operating in certain regions, such as the tongue, mouth, throat, and rectum, where asepsis cannot be secured with certainty.

"Dr. A. E. Wright's researches with regard to localized staphylococcus infection, as in boils, acne, and syphilis, have shown that in all these cases there is a defective power of phagocytosis with respect to the staphylococcus, as well as invasion by that organism. The inoculation of a staphylococcus vaccine has the effect in a considerable proportion of cases of immunizing the patient against the special organism, and in the *Lancet* for March 26, 1902, Dr. Wright has given his experience of the remarkable results he has obtained in these well-known and troublesome diseases of the skin and hair follicles.

"These researches on the localized cutaneous invasions of staphylococci have paved the way for further therapeutic applications in connection with wounds and open ulcers.

"It seems not improbable, in the early future, that in all inflammations, whether of the respiratory tracts or the pleura, of the brain or the meninges, of the uterus or its appendages, of the middle ear and its sinuses, of the abdomen and its contained viscera, as well as of the joints and bones, that the services of a skilled pathologist will be required, who will by a blood examination or otherwise determine the organism or organisms causing the infection, when the appropriate serum or vaccine will be immediately employed, so as to arrest the inflammatory process, or in case of the disease having advanced too far for arrest, to limit its extension, and by a process of immunization to prepare the patient for operation, should such be called for.

"Gentlemen, I have tried to show that the advances in treatment during the past third of a century have been commensurate with our increased knowledge of disease, and simply on account of time have I limited myself in a great measure to diseases of the abdominal cavity.

"I have tried to show what a close connection exists between the science and art of our profession, and how very necessary it is, if we are to continue our march of progress, that experimental research should not only be untrammelled by factions and unreasonable opposition, but that it should receive greater recognition, encouragement, and support at the hands of the public.

"I have tried to forecast the future, and to show that while surgery has still great strides to make and many difficulties to conquer, such progress will be in a great measure intimately bound up with the work of the physician, the pathologist, and the bacteriologist, and I think the time will come when preventive measures such as I have portrayed will save much operative work, and when it will be thought a greater triumph to prevent than to cure disease.

"We can see that methods and policies which were sufficient years ago are totally inadequate to-day. We may modify but we can not prevent the world's advance, and while times change men change with them. The

medical profession is imbued with a spirit that half a century ago was undreamed of. Not only have apparently unsurmountable difficulties been overcome, but habits of thought have been attained which have made such achievements possible, and a scientific attitude of mind has become characteristic of our profession, as it has of the leaders in every branch of the world's progress.

"In becoming more scientific, it is a mistake to suppose that the medical profession has lost touch with higher beliefs. As Lord Kelvin has so happily stated it lately, 'Science positively affirms creative power. We only know God in His works, but we are absolutely forced by science to believe with perfect confidence in a directive power, in an influence other than physical, or dynamical, or electrical force.' There is no harm in free thinking, for if we think strongly enough we are forced by science to the belief in a higher power, which is the foundation of all religion."

(To be Continued.)

BOOK REVIEWS.

TRANSACTIONS OF THE AMERICAN OPHTHALMOLOGICAL SOCIETY. Thirty-eighth Annual Meeting, New London, Conn. 1902. Vol. IX. Pt. 3. Hartford, Conn. Published by the Society.

It is but faint praise to state that these Transactions increase in value from year to year. The Society records here the loss of one of its most distinguished founders in the person of Dr. Henry D. Noyes, whose portrait is the frontispiece and whose well-written eulogy is the foreword of the book. Glaucoma is again carefully studied. Many cases of carcinoma are reported. A study of changes caused by injections of pure cultures of *Bacillus typhosus* into the anterior chamber of rabbits' eyes is carefully recorded. There is a study of the diffusion circle in correction of ametropia. Cases of tobacco amblyopia, methyl alcohol debauch and fatal cavernous sinus thrombosis from grip with its important treatment, are reported; also a careful study of "ossification of the choroid." Tests for color-vision are reconsidered. Finally a careful study is made of primary insertions of the ocular muscles. The whole is a volume of great value.

UTERINE AND TUBAL GESTATION. By SAMUEL WYLLIS BANDLER, M.D., Instructor in Gynecology, New York Post-Graduate Medical School. Wm. Wood & Co., New York.

THIS little volume is but an elaboration of articles on the same subjects published in The American Journal of Obstetrics and Gynecology.

In a way it is decidedly unique, in that it deals with the subjects almost entirely from the laboratory point of view, giving us the true scientific aspect of the conditions which occur in the tissues of the maternal generative organism during both tubal and uterine gestation. It is most unfortunate, however, that such a book will not prove to be of much service to the medical profession at large, as it is too technical and requires a too intimate knowledge of histology, embryology and pathology for the average practitioner to appreciate what the author has to say.

The third portion of the book is devoted to the histology of that most interesting condition known as chorio-epithelioma. The author suggests that the origin of the metastases may be explained by the fact that fetal cells are carried into the maternal circulation and are deposited here and there to become foci of prolifer-

ative cell agglomerations of the fetal type. But this does not seem satisfactory, for if such were the case we might with reason expect the metastases of liver, kidney or cells from any fetal organ to do the same thing.

Dr. Bandler's book deserves commendation from the thoroughness and clearness of its subject-matter and is undoubtedly a valuable treatise of its kind.

A TEXT-BOOK OF CHEMISTRY FOR STUDENTS OF MEDICINE, PHARMACY, AND DENTISTRY. By EDWARD CURTIS HILL, M.D., Professor of Chemistry and Toxicology in the Denver and Gross College of Medicine, University of Denver. F. A. Davis Company, Philadelphia.

WHILE a work of the more or less conventional type this volume of Dr. Hill's has much to commend it, particularly to students of pharmacy and of medicine.

The information is reliable, well arranged and well chosen; there are excellent chapters on drug incompatibility in prescriptions and on adulterations and sophistications in food—chapters that can not fail to be of immense interest to all students.

We find very little of the newer physical chemistry of Ostwald, Nernst and others, much of which might have been incorporated to advantage, but for practical purposes the book is in many senses admirably adapted for the needs of the students for whom it was prepared.

DISEASES OF THE HEART AND ARTERIAL SYSTEM. Designed to be a Practical Presentation for the Use of Students and Practitioners of Medicine. By ROBERT H. BABCOCK, A.M., M.D., Professor of Clinical Medicine and Diseases of the Chest, College of Physicians and Surgeons, Chicago. D. Appleton & Co., New York and London.

IN many ways this is a remarkable book. It not only reflects great credit on the author for his grit in overcoming what to most men would have proved insuperable obstacles, but he has moreover given us almost the first good authoritative work on diseases of the heart and blood-vessels by an American author.

There are 853 pages of closely written text with over one hundred illustrations, most of which are admirable from both the pedagogic and artistic standpoints. The book-making is in accord with the publishers' well-recognized sterling quality.

In its general scope and mode of handling the work does not differ very widely from other well-recognized standards. Foreign and home authors are widely quoted, but nevertheless the work has a distinct individuality.

We feel that we can recognize in this work an entirely new note of a superior character, a refinement much above the average of the descriptions of sound phenomena that stamp it as unique. The signs gained by the organs of hearing are here given with a completeness and finesse that is not found elsewhere. The author's blindness has made the medical world profit thereby, for special analysis of sound phenomena has undoubtedly given him an acuity of this sense possessed by few others.

Another point of advantage is the plain practical and straightforward character of the author's descriptions and his lengthy consideration of the therapeutic side of the problems presented. Treatment is full and very satisfactory.

We commend to our readers this work of Babcock's as a very desirable work for both the specialist and the practitioner, and wish the author a most hearty welcome for his admirable literary endeavor.